RAILROAD GAZETTE

FRIDAY, MAY 26.

Train Accidents in April.

The following accidents are included in our record for the month of April:

REAR COLLISIONS.

On the morning of the 1st, as a freight train on the Buffalo, Pittsburgh & Western road was switching at Mayville, N. Y., a car broke loose and ran down grade into a detached section of the train, wrecking two cars.

On the afternoon of the 1st a freight train on the Pittsburgh, Ft. Wayne & Chicago road ran into the rear of a preceding freight near Remington, Pa., wrecking the caboose.

About noon on the 3rd a freight train on the Baltimore & Ohio ran into the rear of another freight near Benwood, W. Va., wrecking several cars.

On the night of the 4th a freight train on the New York, Lake Erie & Western road broke in two near Port Jervis, N. Y., and the rear section ran into the forward one, wrecking several cars.

On the night of the 4th a passenger train on the Canadian Pacific road ran into the rear of a freight near Winnipeg, Man., wrecking the caboose and killing a brakeman.

On the morning of the 10th as a passenger train on the New York, Lake Erie & Western road was running into the station in Jersey City, N. J., by a flying switch, as all passenger trains do there, the switchman failed to turn the switch quickly enough, and the train ran into the rear of the engine. Several cars had their platforms broken and two men were hurt.

On the afternoon of the 13th a freight train on the Grand Rapids & Indiana road ran into the rear of a ballast train near Grand Rapids, Mich., wrecking several cars.

On the night of the 13th, near Berea, O., a freight train on the Lake Shore & Michigan Southern road ran into some cars which had broken loose from a preceding freight.

On the afternoon of the 14th some coal cars running down an incline at Three Rivers, Mich., on the Michigan Central road, could not be stopped and ran into a freight train on the main line, wrecking several cars.

On the evening of the 15th a coal train on the Central Railroad of New Jersey ran into the rear of a preceding coal train near Bloomsburg, N. J., wrecking several cars.

Very early on the morning of the 16th a freight train on the Troy & Greenfield road broke in two in the Hoosac tunnel and the rear section ran into the forward one, wrecking five cars. The wreck was piled up and wedged in in the narrow space of the tunnel, making it very troublesome and difficult for the wreck-train men, who were nearly ten hours clearing the track.

On the night of the 16th a freight train on the Pennsylvania Railroad ran into a preceding freight near Wilmore, Pa. Five cars were wrecked and an engine thrown over down a bank and badly broken.

On the morning of the 17th a freight train on the Detroit, Lansing & Northern road ran into some cars which had been left on the main track in Ionia, Mich., wrecking a car.

On the 17th a freight train on the Central Railroad of Georgia ran over a misplaced switch at Box Spring, Ga., and into another freight standing on a siding, wrecking several cars.

On the afternoon of the 18th a passenger train on the Indiana, Bloomington & Western road ran into the rear of a freight, which was just going into a siding at Ogden, Ill. The engine and several cars were damaged and three trainmen hurt.

On the morning of the 19th a passenger train on the Eastern road ran into the rear of a ballast train at Castle Hill, Mass. The engine and baggage car were wrecked and five trainmen hurt.

On the afternoon of the 19th a freight train on the Louisville, New Albany & Chicago road ran into some cars which had been run out of a siding on the main track near Crawfordsville, Ind. The engine was wrecked.

On the night of the 19th a passenger train on the Chicago, Rock Island & Pacific road ran into a box car which had been run out of a siding upon the main track at Carbon Cliff, Ill. The engine and a car were damaged.

On the night of the 19th a freight train on the Baltimore & Ohio road ran into some cars which had been blown out of a siding upon the main track at Monrovia, Md. The engine and several cars were wrecked, the fireman killed and the engineer hurt.

Very early on the morning of the 20th a freight train on the Philadelphia, Wilmington & Baltimore road ran over a misplaced switch and into a freight train on a siding at Lamokin, Pa., damaging a locomotive.

On the afternoon of the 20th a yard engine ran into the rear of a ballast train on the Pittsburgh, Wheeling & Kentucky road in Wheeling, W. Va. The engine and several cars were damaged, the engineer and a brakeman hurt.

On the afternoon of the 20th a passenger train on the Detroit, Mackinac & Marquette road ran into the rear of a freight near Marquette, Mich., piling up 30 ore cars in a bad wreck.

On the morning of the 23d a freight train on the Illinois Central road ran over a misplaced switch and into another freight train on a siding in Cairo, Ill. The engine and three cars were wrecked.

On the afternoon of the 24th a loaded coal car was run out of a coal pit siding on the Cleveland & Pittsburg road, near Steubenville, O., just as a freight train was passing, and struck the train, damaging two cars badly.

On the night of the 25th a construction train on the Galveston, Harrisburg & San Antonio road ran into the rear of a preceding construction train at Eagle Pass, Texas, wrecking several cars, killing one laborer, and injuring three others.

On the morning of the 27th a freight train on the Chicago & Alton road ran into a car which had in some way been run out of a siding upon the main track at Grain Valley, Mo. The engine and two cars were badly broken and the engineer hurt.

On the evening of the 28th a passenger train on the Philadelphia & Reading road ran into a wrecking train, which had been thrown from the track a minute before in Tamaqua, Pa. Several cars were damaged.

BUTTING COLLISIONS.

On the morning of the 4th there was a butting collision between two freight trains on the New York, Lake Erie & Western road, near Rowlands, Pa., by which both engines and 12 cars were wrecked. It was caused, it is said, by a dispatcher's failure to give proper orders.

On the afternoon of the 14th there was a butting collision between a passenger and a freight train on the New York, Lake Erie & Western road, near Newburgh, N. Y. Both engines and a car were slightly damaged.

About noon on the 19th there was a butting collision between two yard engines, in the Chicago & Northwestern yard at Negaunee, Mich., blocking the main track five hours.

On the night of the 19th there was a butting collision between a passenger and a freight train on the Intercolonial road, near Spring Hill, N. B. Both engines were damaged.

On the afternoon of the 21st there was a butting collision between a freight and a construction train on the Detroit, Grand Haven & Milwaukee road at Saddlebag Swamp, Mich. Both engines and several cars were wrecked.

On the night of the 26th a freight train on the Boston, Concord & Montreal road broke in two near Warren Summit, N. H., and the rear section ran back down the grade and into the head of a following freight. The engine and 15 cars were piled up in a bad wreck and the conductor and a brakeman killed.

Early on the morning of the 30th there was a butting collision between a freight and an emigrant train in the yard at Rochester, N. Y., on the New York Central & Hudson River road. Both engines and several cars were badly broken and two passengers hurt.

CROSSING COLLISIONS.

On the morning of the 4th a freight train on the Lake Shore & Michigan Southern road ran into a Chicago, Burlington & Quincy freight at the crossing in Chicago, Ill. An engine and two cars were damaged and a fireman hurt.

DERAILMENTS, BROKEN BRIDGE.

On the night of the 1st a freight train on the Wabash, St. Louis & Pacific road broke through a bridge near Vienna, Ill., and nine cars went down in a bad wreck. A brakeman was killed.

On the night of the 9th a freight train on the Chicago, Burlington & Quincy road broke through a small bridge near Louisville, Neb., and 13 cars were wrecked.

On the night of the 10th the engine and two cars of a freight train broke through a small bridge near Benton, Tex., on the Gulf, Colorado & Santa Fe road.

On the afternoon of the 18th a freight train on the Kansas Central road broke through a small bridge near Garrison, Kan., which had been partially burned through by a slow, smoldering fire.

On the 24th a passenger train on the Texas-Mexican road went through a bridge near Corpus Christi, Tex., and was wrecked. The wreck and the bridge were partly destroyed by fire. The engineer and fireman were killed and five others hurt.

On the afternoon of the 26th a trestle bridge at Sand Run, O., gave way under a freight train on the Columbus, Hocking Valley & Toledo road, and the engine went down into the run and was wrecked. The engineer and fireman were killed and a brakeman fatally hurt.

DERAILMENTS, SPREADING OF RAILS.

On the afternoon of the 3d the engine and two cars of a passenger train were thrown from the track near Marshall, Mich., by the spreading of the rails.

On the afternoon of the 13th two cars of a passenger train on the Western & Atlantic road were thrown from the track near Copeland, Tenn., by the spreading of the rails.

On the 17th three cars of a freight train on the Baltimore & Ohio road were thrown from the track near Somerset, Pa., by the spreading of the rails.

On the afternoon of the 17th several cars of a freight train on the Pittsburgh, Cincinnati & St. Louis road were thrown from the track near New Paris, O., by the spreading of the rails.

On the morning of the 24th several cars of a freight train on the Utah & Northern road were thrown from the track near Oxford, Utah, by the spreading of the rails. A brakeman was hurt.

DERAILMENTS, BROKEN WHEEL.

About noon on the 1st several cars of a passenger train on the Chicago, Milwaukee & St. Paul road were thrown from the track near Red Wing, Minn., by a broken wheel. The cars upset, injuring five passengers.

On the morning of the 23d several cars of a freight train on the New York Central & Hudson River road were thrown from the track at Fairmount, N. Y., by a broken wheel.

DERAILMENTS, BROKEN AXLE.

On the evening of the 4th several cars of a freight train on the Vicksburg & Brunswick road were thrown from the track near Eufaula, Ala., by a broken axle. The cars were dragged over the ties upon a trestle, which was badly damaged.

On the night of the 4th a car of a freight train on the St. Louis & San Francisco road was thrown from the track near Springfield, Mo., by a broken axle.

On the morning of the 21st several cars of a freight train on the Cleveland, Akron & Columbus road were thrown from the track on the bridge over Alum Creek, O., by a broken axle. The shock knocked down the bridge, and nine cars went down with it into the creek.

On the morning of the 23d the engine of a passenger train on the West Jersey road was thrown from the track in Camden, N. J., by a broken axle.

DERAILMENT, BROKEN TRUCK.

On the morning of the 5th a car of a freight train on the New York, Lake Erie & Western road was thrown from the track in Port Jervis, N. Y., by a broken truck.

DERAILMENT, ACCIDENTAL OBSTRUCTION.

On the night of the 19th a freight train on the Missouri Pacific road ran into a tree which had fallen across the road near Washington, Mo. The engine and several cars were wrecked and the fireman hurt.

DERAILMENTS, CATTLE.

On the afternoon of the 1st a freight train on the Jeffersonville, Madison & Indianapolis road ran over a cow, just as it was going on a bridge at Columbus, Ind. The engine ran over the ties and into a truss, knocking down one span of the bridge which went down into the river. The engine also went down and 23 cars were piled upon top of it. The engineer was killed and four other trainmen hurt.

On the morning of the 17th a passenger train on the North Pacific road ran over a bull near San Rafael, Cal., and the engine and baggage car were thrown down a high bank and wrecked, injuring three trainmen.

DERAILMENT, OPEN DRAW.

On the afternoon of the 7th a freight train on the New York Central & Hudson River road ran into an open draw at Peekskill, N. Y., the engine and three cars going down into the creek. The bridge-tender was hurt. The evidence is that the usual signals were displayed, but were not seen or noticed until too late.

DERAILMENTS, MISPLACED SWITCHES.

On the afternoon of the 3d the engine and two cars of a freight train were thrown from the track by a misplaced switch at Asbury Park, N. J., on the Central Railroad of New Jersey.

On the morning of the 22d the engine and two cars of a passenger train on the Cincinnati, Indianapolis, St. Louis & Chicago road were thrown from the track in Kankakee, Ill., by a misplaced switch, blocking the road several hours.

Early on the morning of the 26th a passenger train on the Louisville, Cincinnati & Lexington road was thrown from the track in Lexington, Ky., by a misplaced switch. The engineer was killed and the fireman hurt.

On the morning of the 27th a freight train on the Philadelphia, Wilmington & Baltimore road was thrown from the track at Northeast, Md., by a misplaced switch. The engine was damaged, the engineer and fireman hurt.

On the night of the 28th the engine of a wrecked train on the Philadelphia & Reading road was thrown from the track in Tamaqua, Pa., by a misplaced switch.

On the morning of the 30th the engine of a freight train on the St. Louis, Iron Mountain & Southern road was thrown from the track in Texarkana, Ark., by a misplaced switch.

MALICIOUS DERAILMENT.

On the night of the 14th a passenger train on the Atchison, Topeka & Santa Fe road was thrown from the track near Rincon, N. M., by obstructions placed by a band of cowboys, who tried to rob the train, but were driven off. The engine was wrecked, the engineer and fireman killed.

UNEXPLAINED DERAILMENTS.

On the afternoon of the 3d a freight train on the Pittsburgh, Cincinnati & St. Louis road ran off the track near Xenia, O., wrecking the engine and several cars, and injuring three trainmen.

On the afternoon of the 4th a freight train on the Chicago, St. Paul, Minneapolis & Omaha road ran off the track near Black Brook, Wis., blocking the road four hours.

On the morning of the 6th a freight train on the Wabash, St. Louis & Pacific ran of the track near Boody, Ill., and several cars were wrecked.

On the afternoon of the 11th a passenger train on the Pittsburgh, Cincinnati & St. Louis road ran off the track at Glady Run, O., and the baggage car was damaged.

On the afternoon of the 16th several cars of a freight train ran off the track near Montgomery, Ala., on the Louisville & Nashville road.

On the night of the 16th several cars of a freight train on the Indiana, Bloomington & Western road ran off the track at Twin Grove, Ill., and were wrecked.

On the evening of the 18th nine cars of a freight train on the Central Vermont road were thrown from the track near South Charlestown, N. H., blocking the road all night.

On the night of the 18th a car of a passenger train on the Utah & Northern road ran off the track near Ogden, Utah, and upset.

On the night of the 18th some cars of a passenger train ran off the track near Donnelly, Minn., on the St. Paul, Minneapolis & Manitoba road.

On the morning of the 19th four cars of a freight train on the Eastern road ran off the track in Lawrence, Mass., and one was wrecked.

On the night of the 23d two cars of a passenger train on the Indianapolis & St. Louis road ran off the track in Indianapolis, Ind., blocking the road three hours. Two passengers were hurt.

On the morning of the 24th a car of a freight train ran off the track at Rich Hill, Mo., on the Missouri Pacific road.

On the night of the 25th the engine and six cars of a freight train on the New York, Pennsylvania & Ohio road were thrown from the track at Stearnburg, N. Y., blocking the road several hours.

On the afternoon of the 25th five cars of a passenger train on the Denver & Rio Grande road ran off the track near Cañon City, Col., and were badly damaged, injuring 15 passengers.

On the evening of the 28th five cars of a freight train were thrown from the track in Tamaqua, Pa., on the Central Railroad of New Jersey.

On the morning of the 29th the engine of a ballast train on the Albany & Susquehanna road ran off the track near Schoharie Junction, N. Y., and upset. The engine was wrecked, the engineer and fireman killed.

OTHER ACCIDENT.

On the morning of the 9th the engine of a passenger train on the West Jersey road broke a connecting-rod when near Malaga, N. J., doing considerable damage.

This is a total of 83 accidents, by which 18 persons were killed and 61 injured. Seventeen of the killed and 30 of the injured were employés, while only one person killed and 31 injured were passengers.

As compared with April, 1881, there was an increase of 18 accidents, but a decrease of 4 in the number killed and of 5 in the injured.

In the four months of 1882 there have been reported 405 accidents, 111 killed and 429 injured; a monthly average of 101 accidents, 28 killed and 107 injured.

April has the smallest number of accidents for the year so far, but an increase over April of last year.

The Late Moses Taylor.

Moses Taylor, who for many years has been one of the chief owners of American railroad stocks and a director in many companies, from Lake Superior to Texas, and from New York to Georgia, and had accumulated a fortune estimated at $40,000,000 to $45,000,000, died at his house, No. 122 Fifth avenue, New York, Tuesday, May 23. Of his railroad investments the New York *Tribune* says:

It was one of the most prominent traits in Mr. Taylor' character that he never gave assistance or support to an enterprise until he had investigated it with great care and thoroughness. If the result of his examination was unfavorable nothing would induce him to give the scheme the desired aid: if it was satisfactory he pledged his money and his name to its success. All the enterprises in which he engaged were intended to be permanent investments; they were not speculations from which he might snatch a hasty profit. Mr. Taylor, indeed, never speculated in stocks, but what he bought he paid for and kept. He seldom abandoned anything that once had enlisted his support. The corporations, therefore, in which he was most prominent, and in which he will be most sadly missed, are those in which he was first concerned many years ago. Of these the most conspicuous are the Delaware, Lackawanna & Western Railroad and the Lackawanna Iron & Coal companies. Mr. Taylor was one of the foremost in aiding the development of the northern coal region of Pennsylvania. His attention had been called to the great mineral wealth of the Wyoming and Lackawanna valleys when they had hardly been disturbed, and to the importance of connecting the region with New York by railroad. He was one of the few men who helped push the road to completion. He was not the originator of either the railroad or the iron company, but, confident of the value of both enterprises, he gave them his aid and support. His real interest in the railroad was not large, however, until after the panic of 1857, when the company became embarrassed. The price of the stock fell to about $5 a share, and then Mr. Taylor bought a very large amount, so that practically he was the owner of the road. From this purchase he made an immense

profit, for within seven years the same stock virtually sold at $240 a share. Samuel Sloan became a director of the company in 1864, and five years afterward, yielding to Mr. Taylor's solicitations, he became the President. In this and in other companies Mr. Sloan has been ever since one of Mr. Taylor's associates and representatives.

Within two years after the opening of the road from Scranton to Great Bend, where it connects with the Erie, the Lackawanna Iron & Coal Company was formed. Mr. Taylor became a director of the company in 1858, and on the death of Joseph H. Scranton, 1872, he was elected President. The company since its difficulties in the panic of 1857 has been one of the largest and most prosperous of the companies of its class.

Mr. Taylor was one of the five persons who formed the first company to lay an Atlantic cable. Believing in the final accomplishment of the project, he stood manfully by it during twelve long years, and to him as much as to any one of the original promoters, perhaps, was due its triumph. He was treasurer of the company from its beginning in 1854 to 1873, when it became part of the Anglo-American Cable Company.

One of the first and most profitable investments outside of his regular business which Mr. Taylor made was the purchase of a large amount of the stock of the Manhattan Gaslight Company of this city. Previous bad management had caused the price of the stock to fall to a point far below its intrinsic worth and at prices somewhere between 30 and 40. Mr. Taylor bought enough to give him the control of the company. Under his wise direction the company has brought him a large fortune from the investment. He realized extensive profits also from his purchases of the stock of the Central Railroad of Georgia and from some of his railroad enterprises in Texas. Not all of these, however, were successes, and the International Railroad was forced to default on its interest while he was a controlling spirit in its management. Mr. Taylor felt the humiliation of the failure very keenly. At one time he was a director in the Philadelphia & Reading Railroad, but he became dissatisfied with the management and retired from the board. It is a singular fact he never owned any stock in the Vanderbilt railroads. Commodore Vanderbilt kept for years an account at the City Bank, and, being intimate with the President, frequently urged him to join in his schemes. But Mr. Taylor never bought a share of his stocks, although he loaned Commodore Vanderbilt large sums without other security than his name. It is said, however, that Mr. Taylor absolutely refused to aid the Commodore in some of his operations simply because he did not approve them. In one case at least his refusal was a defeat to Mr. Vanderbilt's purpose. A bank president familiar with both men said recently that they were too much alike in some respects to make such co-operation possible; that both wished to be absolute masters of their operations. At the same time their personal relations were close, and between them there was always a strong mutual regard.

In all the corporations in which Mr. Taylor was interested he was always an officer of great influence, and many of them owed to him directly their final success. As an officer his wisdom and sagacity were always recognized by his associates. Not one of them was more prompt in attendance at meetings and in discharge of official duties. Throughout his life Mr. Taylor was remarkable for his activity and promptness. He was daily at the bank at 9 o'clock, and he felt it severely when compelled by sickness to be absent. In the words of one of his friends, "it almost broke his heart" the first day he was unable to be at the bank at the usual hour. The active management of the commercial firm Mr. Taylor surrendered many years ago to Percy R. Pyne, a son-in-law, who was connected with him 45 years, and to Lawrence Turnure, who had been with him nearly as long. He remained to the last, however, a general partner.

Contributions.

Papers on Painting.—No. 5.

BY CHARLES L. CONDIT.

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THE DECAY OF PAINT AND VARNISH.

Varnish and paint disappear in three ways (1) by cracking, (2) by peeling, (3) by perishing.

These are simple processes; it is quite easy to assign causes for them; but this, as we have found, is not quite the same as discovering what the true and most active causes of destruction are.

The principal agents in destruction are undoubtedly the sun, water, cold, the oxygen of the air and the friction of storms of wind and rain. Paint not exposed to violence or to moisture will last a very long time. Dr. Liebreich says:

"The amount of external injury oil paintings sometimes endure and stand is perfectly amazing. Pictures in the course of centuries, during the destructive fury of wars and revolutions, may have been torn out of their frames, rescued from below the ruins of burned monasteries, may subsequently have passed from one *bric-à-brac* shop to another, where they have been piled up to be pulled about at each new inspection, and literally trodden under foot, whereby they have finally been reduced to a state of colorless, grayish, or black rags. Still such pictures may not unfrequently be awakened, as it were, to new life, to their original brilliancy of color, if, with all necessary care, their injured limbs are put together again, their wounds are healed, and fresh nourishment, air and thorough cleansing are administered to their lacerated bodies.

"A sound constitution is, of course, a necessary condition for obtaining any such result; without it we can only obtain a partial cure."

Prof. Max Pettenkoffer, one of the ablest scientific men in Europe, has, fortunately, investigated the decay of varnish and paint on pictures. Many old pictures become darkened by a change in the varnish, formerly supposed to be due to mold. This was proved to be a mistake, and the true cause of the whitening and lack of transparency shown to be due to a partial separation of the gum of the varnish into a fine powder. A piece of transparent glass becomes white and no longer transparent when ground to a powder, without any change in the substance of the glass—merely a change in its form. Pettenkoffer proved that this powdering of the glassy varnish was due to the evaporation of water which had been deposited by the air upon the surface of the picture; and he produced a like result by frequently wetting the surface of a picture, allowing the water to evaporate as if put there by natural means. The immediate cause of the whitening is, as we have said, the resulting separation of the varnish gum from the oil in which it is held.

In the great gallery at Munich, 52 per cent. of the pictures in rooms with a northern exposure were found to be more or less affected by this powdering of the varnish; in rooms with a southern exposure but 10 per cent. were so affected. We may, therefore, rest quite certainly on the fact that the evaporation of moisture has much to do with the decay of varnish. The influence of moisture is the more evident from the fact that other galleries than those at Munich suffer less from moisture and more from other causes. The dampness of these galleries compared with the dry and bright warmth of those in Italy shows that only the *direct* influence of the sun is injurious to paint; to direct sunlight and the rain, hail and snow must be looked for the destructive agencies which lie outside the paint itself.

CRACKING.

Intending to return to the consideration of perishing, we may here profitably study the cracking of paint and varnish. One turns naturally to contraction and expansion of wood as a cause of this cracking upon all wooden structures.

The following table, the result of French experiments, is interesting in this respect:

Increase of measurement when thoroughly saturated. The increase represents proportion to 100 parts of measure.

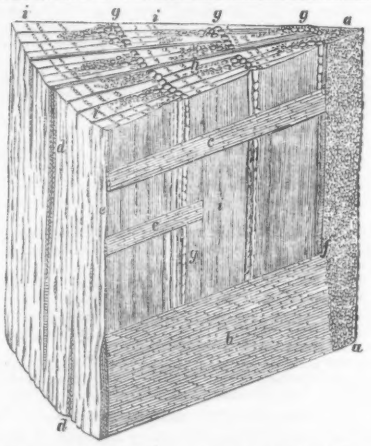
	Length.	Breadth.
Maple	0.072	3.350
Apple	0.109	3.000
Birch	0.222	3.860
Pear	0.228	3.940
White beech	0.400	6.660
Purple "	0.200	5.030
Box	0.026	6.020
Cedar	0.017	1.300
Ebony	0.010	2.130
Young oak	0.400	3.900
Old oak	0.130	3.130
Young ash	0.821	4.050
Old ash	0.187	3.840
Fir-wood	0.076	2.410

Perhaps more satisfactory measurements have been made in Germany by Karmarsch, which are so valuable that we give them also in full:

Amount of shrinking in percentages.

KIND OF WOOD.	In length.*	CROSS SECTION	
		Directly through.†	In direction‡ of yearly rings.
Maple	0.062 to 0.200	2.0 to 5.4	4.13 to 7.3
Pine	2.228	2.9 to 3.94	5.5 to 12.7
Red beech	0.20 to 0.34	2.3 to 6.0	5.0 to 10.4
Oak	0.028 to 0.435	1.1 to 7.5	2.5 to 10.6
Ash	0.187 to 0.821	0.5 to 7.8	2.6 to 11.8
Pitch pine	0.076	1.1 to 2.8	2.0 to 7.3
Fir	0.008 to 0.201	0.6 to 3.8	2.0 to 6.8
Larch	0.013 to 0.288	0.3 to 7.3	1.4 to 7.1
Mahogony	0.110	1.09	1.70
Walnut	0.223	2.6 to 8.2	4.0 to 17.6
Poplar	0.068 to 0.62	1.2 to 4.2	2.8 to 9.8
White pine	0.086 to 0.122	1.7 to 4.82	4.1 to 8.13
Elm	0.014 to 0.63	1.2 to 4.6	2.7 to 8.5

* In line *a* to *a*. About 1-10 of 1 per cent.
† In line of layers marked *c*. About 5 per cent.
‡ In line of *i* to *i*. About 10 per cent.



It will be seen that the expansion of wood due to moisture is from 5 times (in young ash) to 213 times (in ebony) greater in its breadth than in its length. One would naturally expect, therefore, to find cracks in paint and varnish parting as the fibres of the wood part—namely, parallel with its grain. The facts are that those cracks, extending with the grain, are much less numerous and of less importance than those extending across the grain. Within the house, or car, nearly all cracks run at right angles to the grain of the wood. Out of doors, except with very green wood or very poor materials, cracks of much consequence do not appear in the wood until this has become dry and shrunken, and has expanded again in some "spell" of bad weather, or by the admission of water through cracks in paint or varnish, which cracks first appeared across its grain. It is surprising how much a door or panel may shrink without cracking its paint—at least without cracking it as wood always "checks," namely, with its grain. The reason is very simple. In the shrinking of wood, every little fibre comes closer to its neighbors, and the larger fibres especially raise the paint or varnish in little folds, which remain as so much "slack," ready to be stretched again.

The strain at every point, whether from contraction or expansion, is thus made very gentle, as one may see from the fact that a deep "check" in the wood cracks varnish only when and at that place where the wood itself is torn apart. Previous to this the total strain in the wood must have been very considerable, but it did not crack the varnish.

The contraction of wood in breadth, and its small contraction in length, may, however, give *direction* to the cracking of paint and varnish. If the contraction of the paint or varnish upon itself produces the cracks, then the greater contraction of the wood in breadth will prevent cracks extending with the grain of the wood. Even this, however, does not seem to be the principal reason why varnish and paint crack at right angles to the wood fibres.

Does Heat Crack Varnish.—In order to make sure that the contraction of wood has little effect on good paint or varnish, one may observe the influence of heat on painted surfaces.

Heat does not crack paint or varnish; in constant heat both are made elastic. The cabs on the locomotives of a railroad afford an excellent illustration. These locomotives have unusual care, and are well varnished. Nearly all outside and inside surfaces of the cabs are, nevertheless, cracked across the grain of the wood. The exception is the ceiling of the cab, which is at times so hot the hand can hardly be allowed to remain upon it. The wood is badly shrunken, but the varnish is fine and glossy, without apparent cracks, except a few above the side windows, and these are across the grain. The panel back of the steam-gauge is also free from cracks, while the sash of the small windows on either side are full of fine cross-grained cracks. The panel is thick and protected; the sashes are thin and exposed to the cold air, for it is the cooling which cracks varnish. Varnish and paint crack, as a rule, from contraction in their own substance. The effect of heat is to expand and soften varnish, and to drive off the non-drying oil acids. Oil leather does not melt, it only burns. The not hardened part of the linseed oil acid melts, but is apparently not much changed. The not-drying oil acids are changed to light flying acids or to gases, and it is probably these which cause the blistering of varnished surfaces which are much heated. A blistered surface, all that part which remains smooth, seems protected against cracking.

This suggests the relation of the not-drying part of the oil to cracking. From 3 to 5 per cent. (see last article, table 11) of the oil flies away on heating it; and what takes place quickly under heat is more slowly accomplished under the influence of the air. The result must be a (physical) change in the dried oil leather; and therefore an oil with much not-drying acids in it will not serve as an undercoat. We shall discover, probably, that the best and most durable oil for one coat is the worst to put in layers coat over coat.

Heat, also, unites the separated varnish, as a clouded and whitened varnish surface can be made clear by heating.

Cracks Across the Grain.—The best examples of cracks across the grain of the wood are those to be found on carriages. A carriage spoke almost invariably cracks in a circle, or some arc of a circle, across the grain of the wood.

A jar will crack varnish more or less across the grain of its wood, as may be seen on that part of the carriage to which the mounting steps are attached. The jar on the wheels undoubtedly does aid in the cracking. I have made one experiment with a comparatively crackless spoke, and have produced cracks by striking it upon its end. These cracks have a tendency to run diagonally across the grain, some also directly across. On some spokes, at least, it will be observed that the larger cracks are half circles in the central part of the body of the spoke, extending from and to, but not crossing, a line on each side drawn from each side the tenon, and are much more frequent near the hub.

But notwithstanding all these appearances, the facts appear to be that even on spokes it is not the strain and jar which cause these cracks across the grain. Out of 50 show spokes hanging in a paint shop 48 were cracked in more or less complete circles around the spoke. The reason why varnish on spokes has more tendency to crack near the hub is because there is more varnish left there.

Let us now examine the positive side of this cracking.

1st. On a perfect surface paint and varnish have no special direction of cracking, but may part in all directions. On leather, or any pressed or stretched surface, cracking quite often takes a circular form, one circle outside another.

2d. Cracking will occur at that point where the strain is greatest and there is the least elasticity.

3d. The cracking of paint and varnish on wood is controlled commonly as to its direction by the fibres of the wood. If we place together two pieces of wood with smooth surfaces, it will be found that they can be rubbed much more easily with than across the grain. Across the grain each little fibre is meeting resistance from each fibre on the other piece, especially from those larger ones which mark the close of each year's ring or growth. If we place a drop of oil upon a smooth piece of wood, and let fall gently into it other drops, the oil will be seen to move further with than across the grain. Each added drop will make this fact plainer, and if a glass "dropper" be used, the difference between the results of pointing the force of the drop with the grain, or across the grain, will make the fact still more marked, that all movement on the surface of wood is easier with the fibres than at right angles to them.

In all contraction of the paint upon itself, therefore, the movement (contraction is movement) will be easier with the grain than across the grain. This will tend to open cracks across the grain.

Cracks with the Grain.—Many cracks extending with the grain of wood are no doubt due to the expansion of the wood by moisture. They point to the fact that the wood has not been properly protected from moisture. Even if painted on one side, wood in the interior of the house gains from 3 to 6 per cent. of its weight of water in summer, and loses it again in winter.* The gain and loss of wood exposed to the

* This fact I have through the kindness of Professor Brewer, of Yale College, who averaged for me the result of very extended but still incomplete experiments. The figures are true of small not very thick pieces.

weather must be much greater than this. We cannot entirely prevent the action of moist air on wood, but this is not necessary. Good paint and varnish properly used will not crack on this account if the wood is reasonably protected. I speak here of severe cracking; small cracks, of course, will appear, but these are of little consequence. They are easily covered, as are any spots of "perishing." The *fatal disease in paint and varnish is severe cracking.*

Cracking on Cars.—On cars with good surface, small cracks will run in all directions. The larger cracks are generally across the grain of the wood, beginning often at the edges of the panel near panel strips, because at this point a greater thickness of paint and varnish is found. Occasionally one finds a car with long deep cracks extending with the grain of the wood. It is possible that in these cases the wood may be at fault, but if so it shares the blame with the rubbing varnish. But even if the wood be at fault in these cases, it is the expansion and not the contraction which causes the cracking. I cannot prove this, but think it might be proved by careful observation and experiment.

Within the car nearly all cracking extends across the grain of the wood. Fewer cracks will be found on veneered surfaces, and these not always across the grain, probably because the shrinking of the wood on which the veneer is placed has some influence.

Interiors of Buildings.—Cracking is usually across the grain, except about window sills and on doors exposed on one side to damp air.

Exterior of Buildings.—Failure to treat more than one side of wood used in buildings (clapboards, etc.) shows very plainly in cracking of paint on buildings, which is often with the grain of the wood. These cracks are not entirely caused by the wood, but proper treatment of all its sides would better preserve the paint.

Cracks on Furniture.—The cracking of varnish upon furniture is quite uniformly across the wood fibres, except in the case of veneers, which occasionally offer an exception, owing partly to the peculiar way in which they are cut, and partly perhaps to the effect of the wood on which they are fastened. Old furniture, not cracked, if examined with a magnifying glass and the light reflected from the surface of the varnish caught with the glass, will be found to have numerous straight lines running across the grain. These are probably due to the parting a thin layer of the surface varnish which has lost its substance by slow decay faster than the coats beneath it. Varnish on rosewood is specially inclined to cracking. This may be due to a destructive resin in the wood. To sum up the decay of varnish:

1st. Properly treated wood has little destructive influence on paint or varnish.

2d. The so-called "perishing" of paint or varnishing is of less consequence, except as a preliminary cause of cracking. It is easily cured by other coats.

3d. The great and fatal diseases of paint and varnish are cracking and peeling.

4th. Varnish very largely (and paint to a degree) furnishs the force which cracks and destroys it.

5th. If these conclusions are trustworthy, we have these practical rules: (a). Cracking of varnish or paint upon wood in a direction across its grain indicates poor material or an improper use of good ones; *i. e.*, the coats not being old, and sufficient time (which is not often the case) having been allowed for the painting. The painter's most practical question is, how safely to save time.

(b). If the direction of the cracking is with that of the wood-fibres, the gain of moisture by the wood is to be suspected. The wood has not been properly protected on some or all sides.

[TO BE CONTINUED.]

New York Central Standard 34-ft. Cattle Car.

The engravings with this number represent the standard cattle car of the New York Central & Hudson River Railroad and its connecting lines. The same truck is used under these as under the box-cars illustrated May 12. The specifications of these cars differ so little from those of the box-car published in the issue of April 14 it is not necessary to to give them.

The Improvement of the Erie Canal.

[The following letter from Mr. John G. Stevens, President of the United New Jersey Railroad and Canal, which we are permitted by the writer to publish, has, we believe, never been given in full before:]

NEW YORK, Jan. 13, 1882.

HON. WILLIAM H. MURTHA:

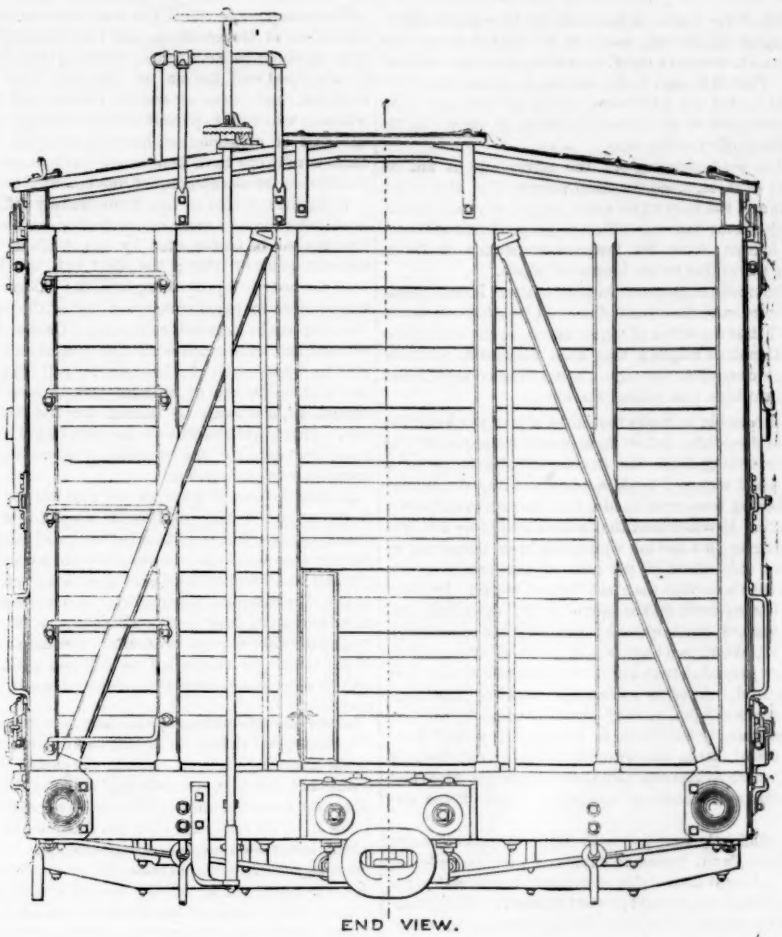
DEAR SIR: In a letter dated Jan. 7, 1882, addressed to Mr. James McMahon, you state that you would be pleased to have my views in regard to "the feasibility of making the following alterations on the Erie Canal":

"1st. Deepening canal one foot and adding one foot to the height of bank.

"2d. Enlarging locks to allow one boat 220 ft. long to be locked in; together with such general views as I may entertain in connection with the object you have in view—and whether the work can be done in winter or without impeding navigation."

It will afford me much pleasure to give you any information I possess, and therefore make a prompt reply to your inquiries. I would further say that I have given much thought and attention to the contest between canal and rail, and while my views may possibly not be acquiesced in by many, yet I can claim that they are not the fruits of a hasty consideration of the subject.

In regard to the first question, to wit, "the feasibility of deepening the canal and raising the banks," I would say that it is not only feasible but would be most judicious, provided it was positively determined to maintain the canal in



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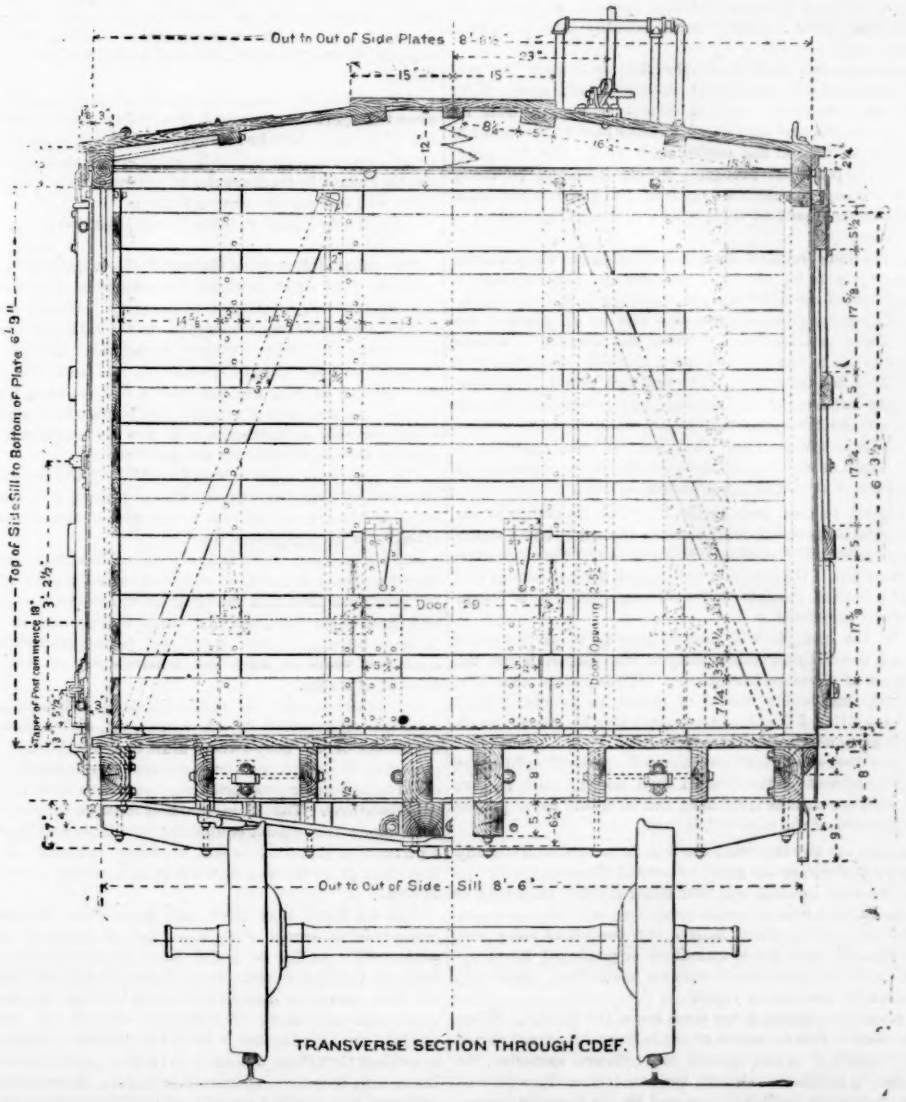


TRANSVERSE SECTION THROUGH CDEF.

STANDARD CATTLE CAR

For New York Central & Hudson River Railroad and its Connecting Lines.

the future. The raising of the banks and the bottoming out of the canal will each produce its own separate result.

The raising of the water of the canal by increased height of embankment will permit boats to be loaded to an increased draught, precisely equal to the height of the raise of the water. That is to say, if the water is raised one foot boats can be loaded one foot deeper than at present. This would be equivalent to an increase of cargo of about 40 to 50 tons in boats of existing class.

In regard to the bottoming out the advantage is not at first sight so obvious, since the fixed points, like the mitre sills of locks and the tops of culverts, forbid any additional draught therefrom; but, nevertheless, great additional benefit would accrue from the lessened resistance of boats through the water due to the increased depth.

Having had some experience in this matter, I can speak with confidence as to the results that will be attained. Some years since I made a series of experiments on the Delaware & Raritan Canal, of which I was then Engineer. Certain sections were deepened, the object being to ascertain what practical advantage was gained thereby.

It being impossible to lower the mitre sills of the locks the advantage of deepening below them would consequently be only the gain arising from the diminished resistance of a boat in deepened water. I could not learn of any similar experiments having been ever made, and the results surprised me very much. It was found that a boat loaded to 6½ ft., when towed through a section which had been deepened to 9 ft., required only about 66 per cent. of the power necessary to tow it in a section that had 7 ft. of water. In other words, two horses could do the same in the deepened sections that formerly had required three; or if the same team was employed, about two days would be saved between Buffalo and Troy provided that an increased depth of two feet should be secured. Another advantage would be that boats could be better managed, as they would be under better control and consequently less liable to damage. I would state that the results of these experiments were so satisfactory that the Delaware & Raritan Canal was deepened two feet below the mitre sills wherever rock did not make it too expensive.

I am not sufficiently familiar with the formations through which the Erie Canal passes to express a positive opinion, but from my general knowledge of the country should judge that no great difficulties would present themselves in bottoming out the Erie Canal, except at some special points, which could be omitted should the cost prove to be exeessive; as to the raising of the banks, it is of course essential that it should be done throughout, and that all points should be raised; very possibly through some of the cities, and perhaps at other points, some difficulties might present themselves, but I do not presume that they would be serious; a careful survey by the State Engineer could reliably determine such points.

Having no data in my possession that bear upon the subject, I can make no estimate of the cost of the above work, but I can see no reason why it cannot be mainly done by dredges; these could deposit the greater part of the material from the bottom on the banks with very little handling. Any of the principal dredging companies could probably give a close approximate estimate of cost; the work could be done in summer and without any practical obstruction to navigation.

I would here remark that the question of water supply would require to be carefully considered. An increase of leakage would occur from three sources; first, from the increased pressure from seven to nine feet on all parts of the bank as now existing; second, from the increase of area of the banks due to raising; and third, from the disturbance of the bottom by deepening. The first two would be permanent; the last less year by year as the interstices of the soil would become filled gradually by the mud deposit. There can be little question but that the increased quantity of water required will be considerable, and that consequently due provision should be made therefor.

In regard to your inquiry No. 2: "The feasibility of enlarging the locks to 210 ft. in length; there can be no doubt of the practicability of doing the work during the suspension of navigation. Of course if the work is done in winter and within a limited time, it will cost more than if a longer time were permitted.

As to the cost, it will depend greatly upon the plans adopted, the cost and accessibility of the materials and the character of the superintendence. While I state that this proposed lengthening would of course be practical, yet I wish to say that I doubt whether such benefit would result from it as would justify the expenditure.

As you desire my views on the whole general subject of the enlargement of the canal, I shall now proceed to give them with the utmost frankness, and as briefly as a proper consideration of the case will permit.

For the past twenty years the Erie Canal has been steadily losing its position as the great avenue of Western trade. In 1853 the canal tonnage was four times greater than that of the Central and Erie railroads combined; in 1881 it was only about one-quarter; these figures tell the whole story, and show that the cause is not transitory or produced by exceptional facts, but must result from an underlying cause that has extended over many years.

To prescribe a remedy one must know the disease. What is the cause of this diversion of trade from the canal to the rail? Clearly it is not because the tolls are excessive, for they barely suffice to maintain the canal in a tolerable condition; nor can it be that it is caused by the transporters exacting too heavy a profit, for this has proved insufficient to rebuild the boats when worn out; nor is it that the ordinary running expenses of boats are extravagant, for hard necessity has compelled a rigid economy, and boat service has never been performed more economically.

The actual cause lies in the fact that the canal, from the necessities of its condition, has been confined to about the same methods as were in use twenty years since; the prism of the canal and the size of the locks have remained unchanged, and these, of course, control the boat capacity, which is too small to permit the use of steam advantageously; the cost of construction, likewise, remains the same. All these conditions have kept canal navigation in a stationary position so far as economy of movement is concerned.

With the railroad it has been entirely different. All the conditions forced a more economical operation; to-day coarse freights can be transported by rail at about one-quarter of the cost price of 1861; the steel rail, the ballasted roadbed, the heavy improved engines, the 20-ton cars, the more experienced management, are a few of the many causes of the progress in railroad economy. Coarse freight in full car and full train loads with fair grades and long hauls can now be transported at a less cost by rail than by canal. The best authorities are of opinion that under the above-stated conditions, a ton can be hauled for 3½ mills per mile by rail. This is not possible on the Erie Canal, if proper allowances are made for the expenses of rebuilding boats and the maintenance of the canal.

Again, the cost of transport by rail has not yet reached its lowest point; it will continue to lessen for a long time to come; the sharp competition between railroads stimulates to further economies and the use of all the latest improvements; old and small engines and cars are being replaced by those of the most modern construction; new tools and fixtures are more and more used; and in all departments the most thorough attention is paid to details. The canal will, therefore, in the future be compelled to contend with a rival which will be more dangerous in the future than it has been in the past.

In seasons when the crops are above the average and there is a consequent deficiency of railroad equipment, a large part of the trade is permitted to seek the canal; but when traffic is dull and cars idle, the railroads will dispute between themselves for business, and will transport at dead cost and even below it. At such times the canal carries at less than cost, taking into view repairs and depreciation. Owners have for years kept their boats in commission at a loss, inasmuch as this was estimated to be less when they were in service than if they were rotting at the wharves untended.

The exceptionally heavy crops of the past few years, coupled with the great export demand, have been of undoubted aid to the canal in keeping up its tonnage; but notwithstanding these favorable conditions, the tendency of traffic is more and more toward the rail.

In addition to the low cost of operating, the rail has additional advantages in the quick transit, in the shipment of car-load lots, in the transportation during the winter months, in the lessened risk and insurance, and in other items.

It is evident from this presentation of facts that the canal must transport at very much lower rates than is now possible, if the trade is to be retained. No small expedients and petty improvements will suffice; any plan that is not sufficiently radical in its character to reduce the cost very materially will necessarily prove a failure.

I would now desire to draw your attention to some very pertinent facts:

The canal differs from the rail in the entire separation of interests that exist between the owners of equipment and the canal itself, considered as property. If boat property is not remunerative, no regard to the future of the canal will induce further investments; reasonable assurances must be had, that the capital invested in new boats will receive such profits as will net not only a fair interest, but such further amounts as will rebuild the boats when worn out, otherwise new investments will not be made, and consequently the supply of boats not maintained.

The position of the railroad is precisely the reverse: the company owning its own equipment renews it in the interest of the fixed property and irrespective of the earnings derived from the equipment itself.

For the past few years the earnings of boat property have been insufficent to meet interest, depreciation and repairs; the result has been that the boats have decreased in number and those in service generally much depreciated in value. A large supply of new boats will be required within the next few years to meet the demands only of the present amount of traffic.

To maintain only the existing business it is necessary to stop the obliteration of the equipment, and to do this the confidence of the boat-owners must be re-established. Any plan that contemplates the permanent restoration of the canal to its former prosperity must take into view the above considerations. The main features must be such as will at once make the present equipment profitable and be of such a permanent character as will convince investors in boats that their property will earn a fair interest for many years to come.

Will the plans that have been heretofore proposed give reasonable assurance that this class of property will be protected? As far as I can learn, two propositions have been put forward as suitable for the restoration of business, the first being to declare the canal toll free by constitutional and legislative enactments; but as all the tolls received are now applied to meet the necessary expenses, it is evident that these will have to be then paid by the state. There will, therefore, strictly speaking, be no reduction of expenses, but simply a transfer of the obligation to pay the canal expenses from one party to the other. In fact, it will be a subsidy, and may be liable to be stopped at any time. Transporters will not stop to inquire whether the policy is judicious or not, but will probably require some more substantial pledge of lessened cost before making further investments in boats, and will naturally look for some actual *bona fide* reduction of cost, and this the second proposition contemplates.

This provides for the extension of the locks to 210 ft. in length, so that one long vessel can be passed, or two boats of ordinary size, at one locking. It is evident that this will not help the existing class of boats, no vessels of the length contemplated by the extension being in existence; the present class of boats would be locked through in pairs, which would be of no benefit, unless they waited until four or six were locked through and then proceed in charge of a tug. The loss of time would, however, be too great to afford any substantial relief. It has been suggested that a class of barge steamers be constructed, so that one might accompany an existing boat through the canal; as the necessary investment to supply the present equipment with barges would be enormous, and it would take many years to construct them, it is plain that no present relief can be looked to from that source.

Having had charge for some years of a canal that had locks of the precise length contemplated, I can say that no economy resulted to the then existing boats from their use; and further, that no parties could be persuaded to build the long vessels contemplated, although great inducements were held out by a remission of tolls; the parties who examined the subject being of opinion that great difficulties would present themselves in the navigating light draught vessels of such length in a canal, particularly if they were steamers and without cargoes. While I did not concur in their views entirely, yet it is evident that the construction of such boats must be to some extent an experiment.

It is, therefore, evident that, should the proposed extension be adopted, no benefit would accrue to the existing boats, and it is very doubtful whether any of a larger class would be built within a reasonable time, even if their construction should be found practicable.

Neither of the proposed plans will, therefore, accomplish either any actual reduction of expense or give that confidence to transporters that will insure a proper supply of boats.

Is there any other plan that would meet the requirements?

A canal capable of passing boats of a capacity of 1,000 tons would undoubtedly decrease the expenses to a point at which competition with the rail would be practicable, but it would be ill-suited to the present equipment, and the enormous necessary expenditure practically forbids its consideration. I believe, however, that the results aimed at by a ship canal can be attained by a simpler and a very much less expensive plan, and feel entirely assured that it is practicable, both as to construction and subsequent operation.

The proposed plan is to extend the present locks 500 feet, so that each lock will admit a tug and a tow of five boats, containing 1,200 to 1,500 tons of cargo. This fleet would practically form one steamer—it would have one engine, one captain and one crew; the cost of tonnage would be reduced to a minimum, and about three hands on deck could steer and take care of the whole fleet; its expenses should not exceed those of a steamer of equal tonnage; it would have, moreover, the manifest advantages over a steamer that it could utilize the present boat equipment, that grain and other coarse freights would continue to be shipped in same sized lots as at present, and could be delivered at such various points as might be thought desirable; and finally, that the tug would not be detained by the receiving or discharging of cargo.

There would be no increase of water used at the locks, nor any addition to the cost of operating the canal.

In addition to this extension, I would recommend that the bottom be deepened and the banks raised, as proposed in your letter of the 7th.

The expenditure would, of course, be very considerable in amount, but yet moderate in view of the results to be attained, and the magnitude of the interests involved. Probably 20 per cent. of the original cost of the canal would cover the expenditure. This can, however, be satisfactorily arrived at by carefully-detailed estimates, which should, I think, be based on rubble masonry with timber facing.

The above suggestion, if adopted, would, in my opinion, reduce the cost of canal transportation, so that it could successfully meet the railroad competition of the future.

Yours respectfully, JOHN G. STEVENS.

Working Single-Track Lines in India.

The following, signed "Gauge Glass," appears in the *Indian Railway Service Gazette* of April 15, under the head of "Single-Line Working," with the statement that it is a paper prepared for the railway conference that was to have met in Calcutta:

India has a railway communication of nearly 11,000 miles, and scarcely 1,000 of that mileage is double line, hence the necessity of a good and reliable system of working by single line is needed. Indian railways have generally adopted the "line clear" system, and undoubtedly as far as that system has been tried it has met all requirements. As regards safety it is not equal to the "staff" system, but even the "staff and ticket" or "split staff" would not afford sufficient facility for the traffic on Indian railways. Stations are a great distance apart—on some lines 15 and 16 miles between stations is not unfrequent, and 10 miles is the usual distance, taking the average of all Indian railways. So, owing to that circumstance, as well as the numerous failures to keep time that occur in daily practice, the difficulty of working by the "staff" system is almost insurmountable.

In America the system usually adopted is that of the "dispatch system," a brief description of which may be of service.

THE DISPATCH SYSTEM.

On lines worked by this system an officer known in railway nomenclature as the "dispatcher" has charge of a length of railway of 100 or 200 or more miles, accor ding to

the amount of traffic to be supervised and the junctions, etc., that may be upon the length. The "dispatcher" has full control over all the movements of trains, engines, etc., from station to station, on his length, and is in direct telegraphic communication with all the station masters. No train or engine can be allowed to move beyond the precincts of any station without the permission of the "dispatcher." He has to arrange the working of all trains, whether ordinary or special, and in case of a train between stations failing to arrive at its next station and requiring an engine to assist, the "dispatcher" is the only official who can order the necessary power and the direction it can move in to assist the disabled train.

The "dispatcher" in America is usually relieved every eight hours, and while in charge his responsibilities are heavy. By a telegraphic code he can stop any train *en route*, order others on, or instruct the guard and driver to follow—or, as it is called in America to be "flagged" by—a preceding train, has a daily sheet of the trains appointed to be run on date, and as he obtains telegraphic information of their arrivals and departures, he notes whether the proper time is maintained. Should the driver or guard discover they are not able to reach the station at which they are booked to cross to time (or on time as the term is used in America), the guard (conductor, American term) must telegraph to the "dispatcher" that the train he (the conductor) is working cannot reach the station where it is booked to cross such a train, according to the working time-table. The "dispatcher" arranges the crossing trains to meet at other stations by either holding or detaining the train running late, and ordering the train it has to meet to proceed on to the next station. One point: before a "dispatcher" can order another train *on* (that is to pass beyond its appointed crossing station) he must have received a reply from the station at which he intends stopping the late train, and also a reply from the conductor that ALL understand their instructions.

The manner of working following trains under the "dispatch system" is different to that in India. The driver and guard with the train preceding carry extra green flags on their engines and vans, or extra *green* lights at night to denote a train is following; and the following train is considered as *a part of the preceding train*, so both the driver and guard with the foremost train, as well as the one following, know what the arrangements are. The driver and guard of the train following receive instructions that they are following (or as the term is in America "flagged by") the preceding train.

The great drawback to this system is the danger of the "dispatcher" being misunderstood, and thereby an accident occurring. The heavy strain on the "dispatcher" may cause him to make a mistake; but in America it is seldom the "dispatcher" fails, but his instructions have frequently been misunderstood or not carried out. The Madras, South Indian and Eastern Bengal railways have adopted this system with some modifications. The Madras Railway work it, but do not appoint that important official the "dispatcher," and make either a heavily taxed station master or Assistant Traffic Manager manage the duties. It was owing to this that the Naggery accident occurred. The guard and driver of the mail leaving Naggery had no "dispatcher" to appeal to, and hence went to destruction. The Madras line has been singularly fortunate to escape with only one serious accident, which will be admitted when the system by which its traffic is worked comes to be understood by practical men. The Eastern Bengal and South Indian railways have some modifications of the system, but in these lines the same drawback exists. The official who attends to the dispatching of trains has other duties to attend to. Another disadvantage to this system is the necessity of informing by telegram or otherwise every driver, guard and station master through the section that an extra train has to be run, and the liability if one driver or guard forgets these instructions leads to an accident. The driver forgetting his instruction about an extra train led to the Amboor accident on the Madras line, and two other minor accidents on other lines working under this system; several misbaps have also occurred which are only known to those connected with the lines in question.

ONE SPECIAL ADVANTAGE this system possesses in America is, that by its flagging and the thorough understanding of all drivers and guards under the system of the precedence and right of way of trains a considerable amount of traffic can be worked should there be a *temporary failure of the telegraphic communication*. This is by drivers and guards never attempting to work up to the crossing station if they are unable to reach it within 10 or 15 minutes of the actual time they are due When telegraphic communication is suspended, and especially when the train to cross is of greater importance than the train working late, the less important train then must wait until the other has arrived, and must not then proceed if other trains are near due. Of course men in India *not specially trained to this system* could not be relied upon, and the suspension of telegraphic communication—which happily seldom occurs in India—means a serious delay with a corresponding heavy risk in working. The advantage the "dispatch" system has over the "line clear" is small, and even those lines working under a rather queer imitation of the dispatch system in India have not yet dared to introduce its special features, owing principally to the exceeding difficulty there would be in training native station masters and many of the other subordinate staff to work by this arrangement of the system.

THE "STAND OVER" SYSTEM.

This is in vogue on many Continental lines, which means a train to wait—never mind how long—for the train it is booked to cross to arrive. This on the Indian lines would never answer, so need not be considered.

THE "LINE CLEAR" SYSTEM.

Most of the Indian railways are worked by this system, and thanks to the late Mr. Batchelor, who for so many years guided the traffic arrangement of the East Indian Railway, Indian railways have been provided with a really advantageous system of single-line working. The system is well known. Before a train can start from a station the station master asks by telegraph whether line is clear, *giving the arrival of the last train from the opposite direction*, or should a train be approaching from an opposite direction the telegram asks "*On arrival, of No—will line be clear?*" etc. The reply states "*On arrival*, etc.—*line is clear*, etc.," and the station master indorses the line clear message, stating *that such a number train has arrived*. These messages are dispatched by the usual telegraph instruments, some lines using "needle instruments," others the Morse system, which is read by the dot and bar. On some lines a telegraphic code by beat of a bell is used, but bell signals are easily misunderstood, so this system gives very little guarantee of safety, and the block signal instrument—on which the system solely depends—may be put to "*all right*" when it ought to be at danger, simply through a misunderstanding of the bell signals. How far this system may be improved must be left to telegraphic engineers, and until these gentlemen design something *more reliable* than the "bell code." Mr. Batchelor's system will maintain its place as the most useful and reliable system of "line clear" working yet adopted on Indian railways.

Good as the present system may be, I wish to direct attention to what appears to be wanting.

Driver and guard have no information whether the train crossed is actually the one reported on the "line clear" beyond the endorsement on the message.

On several occasions mistakes have been made and the line clear indorsed that a train *has* arrived, when *it has* NOT. The most recent mistake was one at Ajmere on the Rajpootana State Railway, but on the East Indian it has also occurred, when several trains have been following each other. For illustration, say three trains are following each other between stations—not an unusual circumstance when traffic is heavy—the first and second trains arrive and the station master forgets the third and gives line clear, indorsing it "*No.——train has arrived.*" Under existing circumstances the driver and guard have not the means of knowing whether the train that has arrived is the correct one, and they start in the face of danger, causing perhaps a serious accident. It must be acknowledged these mistakes are few, but their having occurred is quite sufficient, and the attached proposal will it is hoped prove a check on the fallibilty of the station staff.

TRAINS TO CARRY THEIR NUMBERS ON THEM.

The safeguard proposed is one that will enable all concerned to know the number of the train crossed. During daylight let the number of each be carried on a number board secured on the buffer plank of the engine, stating the number of train worked, or, if a special, the distinguishing letter of that train. For night either a different colored head-light or buffer light might be used, and the distinguishing number or letter of the train might be cut out of tin or zinc and arranged to fit into a groove either before or behind the glass of the white lamp, so as to be readily seen, so that the driver of an out-going train might know the number of the train which had arrived. To the rear brake-van a board should be fixed on each side near where the tail lamps are situated painted with the distinguishing number, if ordinary train, or letter, if a special, these numbers to be painted on *both* sides of the boards, so as to be seen from the front or back of the train. Of course these boards on both engine and guard's van should be interchangeable. At night both of the side lights of the guard's van should have next the front or white glass a number plate of tin or zinc, bearing the number of the train, placed either outside or inside the bull's-eye glass, so as to be distinctly seen. These number plates need not be cut so big as to affect the light. The tin or zinc number or letter plates on the engine lamps or brake-van side lamps to be interchangeable; that is, the van number plate to be interchangeable with any side lights, and the engine number plate suitable to all engine lights in use on that railway.

The advantage of this system would be that the guard and driver could both see that the train named on the line clear as having arrived had reached the station intact. A plea against this will be that before a train can be started from a crossing station the guard just arriving must *sign the arrival book or "In report;"* but I ask how is it possible where the exigencies of the traffic only allow *one minute* for one train to arrive and the other to depart, and not unfrequently where there is only one platform and two trains to be accommodated the arrival train has to *steam through* the station and then put back, and is *not allowed to back* before the train standing at the platform starts away? I ask, how in such a case can it be possible for the guard to sign the arrival book *before the other train starts?* I allude to everyday working on most Indian railways, and I can further show that the provision now made for such *cannot be carried out, in fact is daily and hourly ignored*, hence the urgent necessity that every additional precaution and safeguard should be provided; all concerned in working trains should know the number of the train that had arrived, and if the engine and brake-van denote the number of the train to which they are attached, they will be certain there is no mistake.

It can be easily arranged that the number boards and letters used to-day can be returned to changing stations, at each end of the district on the following day. It would only need three sets of boards and tin or zinc plates for lamps; the latter being all of one size could easily be placed in a small bag, to be returned the same as cash chests and empty dispatch boxes and bags are now. This is the only drawback that can be advanced against the introduction of this extra safety check, and on lines where following trains are worked it is of urgent necessity.

Some may urge that the block system of only *one train on the length at a time* overcomes the necessity for introducing these numbers. I admit it, so long as the block system is rigidly maintained! but let a push of traffic arise, and how soon the block system would have to be withdrawn, except on such districts where, owing to the heavy gradient and a totally insufficient brake power, the block system must be used.

USE OF THE TAPE AND MORSE INSTRUMENTS ONLY.

Mr. Batchelor, when he designed the "line clear system," had at each station a *telegraph clerk* as well as a station master. He perfectly well knew the material with which he had to work, and used *two men* at each station so as to have a check. On some of our state lines, with men of no training and railway experience, no telegraph clerks are used save at some of the principal stations. So this admirable check is withdrawn. The result is a system from which one of the important elements of safety is withdrawn. At Ratyal on the Punjab Northern State Railway not long since, an assistant station master issued a line clear although he had never received such a message; the magistrate was a long time before he could see any satisfactory proof by the books that were brought. Owing to the absence of the simple mechanical appliance of the "paper tape" there was no check. Now for line clear working the Morse instrument with its "paper tape" ought *only* to be used, the "tape" receives the dots and bars "." "—" of the instrument, and the exact message as asked and replied to is mechanically impressed on the paper. This affords a check on the telegraph operator, and as native boys with a smattering of English on 7, 8, 10, 12 rupees* a month, which is the pay so-called telegraph clerks receive, cannot be expected to be paragons of infallibility, a check will aid to keep them right as well as prove who is wrong should a mistake occur. This is undoubtedly required, and neglecting to introduce such a check amounts almost to criminal negligence, punishable under the railway act.

A further simple check could be introduced at each station. A black board with the words "train left" painted upon it, and the names of each station on either side painted at top *in different colors*; below, the station master could write in chalk the number and time the train left, and on its arrival the number should be rubbed out. This would let all know that trains were on the line, and even the illiterate porters and others could easily be taught that writing under such a color meant a train on the line *down* direction and *vice versa*. This would be an additional check to the red lights at each end of station when trains are on the line.

Some telegraphists object to the Morse and prefer the needle instrument, owing to the latter being less liable to get out of order; but this is a small consideration when the check that the tape must confer on all line clear messages is taken into consideration.

* A rupee is less than 50 cents.

Power of Congress to Regulate Interstate Transportation.

The following arguments against the power of Congress to regulate interstate transportation have been offered by ex-Gov. John C. Brown, of Tennessee:

The objections to the passage of any of these bills are numerous, various and unanswerable.

First and generally, the subject is not within the jurisdiction of Congress. Transportation is much older than the constitution of the United States. The framers of the constitution found various modes of transportation in existence when that great fundamental law was framed, and placed none of them within the regulating power of Congress as is contemplated by these bills. It was not pretended that the methods of transportation in vogue at the framing of the constitution fell within the regulating authority of Congress, and if these methods were not, most certainly railroads, their modern substitutes, are not. The constitution has not changed because the modes of transportion have been facilitated and improved.

Second.—The passage of these measures or either of them would be in direct violation of hundreds of contracts lawfully made between various states and various railroad companies. The railroads derive their charters from the states. These charters are contracts. The parties to these contracts are abundantly competent in law to make them. If competent in law to make them, Congress has no power to declare their incompetency to make them, and Congress has no power to wipe out these contracts, to annihilate, invalidate, or alter them.

Third.—Transportation is not commerce, though necessary to commerce; and the arguments that because transportation is necessary to commerce Congress can regulate its charges, includes the argument that other things necessary to commerce may be regulated as to price by the Congress of the United States.

Congress would then have power to regulate the price of the products of the farms, the articles of merchandise in stores and warehouses, the articles of manufacture in mills, and the articles of commercial value in mines; and Congress would also be competent to usurp the powers of the states in relation to common carriers, and to take charge of the business of all other modes of conveyance other than railroads, from the stage coach to the ship. Indeed, the powers of Congress under this false theory would be boundless. There would be no individual or corporate or state control of any business affair in this republic.

Fourth.—The doctrine asserted by these measures was bluntly rejected by the framers of the government. On the 30th of July, 1784, Mr. Monroe, chairman of the committee having the subject in charge, reported the following amendment to the ninth article of confederation: "The United States in Congress assembled shall have the sole and exclusive power of regulating the trade of the states as well with foreign nations *as with each other.*"

This is the doctrine of these interstate commerce measures, a theory that was promptly rejected by the fathers.

Fifth.—The declaration of the Constitution is that the Congress shall have power "to regulate commerce with foreign nations and among the several states." Congress has therefore the same power to regulate the charges for carrying freight and passengers across the ocean in ships that it has to regulate the charges of railroads in the United States, even upon the doctrine of the friends of these interstate commerce bills. But when was it ever claimed that Congress had this regulating power over ocean traffic and travel?

The power of Congress in each of these cases is embodied in the same clause of the constitution, and nothing is plainer than that Congress has no power or class of powers to regulate commerce among the several states than it has not to regulate commerce with foreign nations. As a matter of fact it has much less power in the former case. Congress, for example, can regulate commerce with foreign nations by a tariff. It cannot do this among the several states of the Union, and the states are forbidden to do this as against each other.

Sixth.—The Congress has no power to discriminate in favor of one class of carriers and against all other classes or against one mode of transportation and in favor of all other modes. This last is precisely what these interstate commerce bills propose.

Seventh.—There are thirty-nine distinct governments in this republic, each separate from the other, and each supreme within its own jurisdiction—the thirty-eight governments of the states, and the federal government. Under our constitution and system of governments the classes of subjects to which these interstate commerce bills relate have been confided to the thirty-eight state governments. There they have always until now remained. It is now proposed to take them from the jurisdiction of these thirty-eight governments and place them within the jurisdiction of one government. This is plainly not in the interest of the people, and is not in the direction of the greater but of the less protection of the many and scattered rights of the people. The legislation proposed by these bills, therefore, is not only grossly unconstitutional, but it is really hostile to the interests of the masses, which would have under their operation but one protector where they have now thirty-eight.

THE SCRAP HEAP.

Tempering Steel by Compression.

A French engineer, M. Clémandot, has invented a process for tempering steel, which consists of heating the steel to a cherry red heat, and then submitting it to great pressure very rapidly applied, and leaving it to cool *under pressure*. Tempering in the usual manner, by immersing the heated metal in a liquid which is comparatively very cold, is attributed to the rapid contraction of the outer part of the metal, which thus compresses the interior, causing a concentric molecular compression. M. Clémandot made a great number of experiments, chiefly at the works of the French Hyraulic Company, where he had the use of great hydraulic presses and accumulators, which enabled him to apply instantaneously pressures of 13,750, 20,625 and 27,500 lbs. per square inch. The steel tempered in this way is powerfully magnetized, and remains so without diminution for three to six months after the process; and the inventor has applied it to articles fully forged and finished, without altering their form. Further experiments are to be made to determine the effects of different temperatures and pressures, and the methods best suited to produce the desired temper in any case.

Rochester Car-Wheel Works.

The Rochester Car-wheel Works have made a settlement with their creditors, and the company has obtained new capital and is prepared to prosecute its business vigorously hereafter. Mr. Wm. H. Barnum, of the Barnum-Richardson Co. and the Salisbury Iron Works, is President, W. H. Chapin Vice-President, and C. T. Chapin Secretary and Treasurer, and these and Messrs. Milo B. Richardson and T. W. Whittlesey are the directors. Mr. W. H. Chapin, as heretofore, is the active local manager.

RAILROAD GAZETTE

Published Every Friday.

CONDUCTED BY

S WRIGHT DUNNING AND M. N. FORNEY.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

OPERATING EXPENSES—REPAIRS OF ROADWAY AND TRACK.

In the article of last week, all the items of expenses which are included in the Lake Shore reports under the general head of "Maintenance of Road" were discussed, excepting that of "Repairs of Roadway and Track." This latter was 8.54 per cent. of the total expenses. This includes a variety of work and material required to keep the track in good condition. Unfortunately the Lake Shore and most other railroad reports do not give the expense of maintenance of road in detail, so that in looking at the charge of $963,303.12 for this item, which, as stated, is 8.54 per cent. of the whole, we do not know exactly what that money was expended for. Some light may be shed on it, though, from some other reports. Thus in the report of the Louisville & Nashville Railroad for 1872-3, which is one of the admirable documents prepared by Mr. Fink when he was connected with that line, the cost of repairs for maintenance of way are given in considerable detail, and are reprinted below. Of course the amounts expended for the different items cannot be taken as any certain indication of the cost of such expenses under ordinary circumstances, as the expenditures are dependent very much upon the condition of that line during the time covered by the report quoted from, or rather its condition just previous to the time referred to. In that report it is said "that while the total cost per revenue train mile is less than last year, the cost of the road per mile has increased considerably, on account of the extensive renewals of cross-ties, iron and heavy expenditures." Nevertheless, the figures given and the percentage that each item bears to the whole cost of repairs of road, which is given in the last column, will indicate where the money went to.

Cost of Repairs of Road on the Louisville & Nashville Railroad in the Year 1872-73.

		Per cent.
Adjustment of track	$219,658.13	40.09
Ditching	42,779.45	7.82
Repairs culverts, cattle-guards, etc	11,392.81	2.10
Repairs of ballast	29,717.33	5.26
Repairs of road tools	12,679.52	2.33
Repairs of hand and dump cars	7,895.15	1.46
Repairs of switches	34,998.58	6.42
General expense	17,032.97	3.12
Labor replacing ties	40,258.97	7.36
Train expense, hauling ties	15,189.63	2.79
Repairing iron rails	5,035 18	.94
Labor, relaying track	21,401.34	3.90
Material, joint fastenings	81,491.37	14.84
Train expenses, hauling iron	8,624.96	1.57
Total	$548,155.39	.....

The total was 13.42 per cent. of the whole operating expenses for the year covered by the report. The four items of adjustment of track, ditching, labor replacing ties, labor relaying track included 59.17 per cent. of the above expenses.

In the annual report of the Pennsylvania Railroad for the year 1880, including what is called the Pennsylvania Railroad Division, the details of cost of maintenance of way, omitting repairs of bridges, cost of cross-ties, rails and taxes, are given as follows:

Cost of Repairs of Road on the Pennsylvania Railroad Division in 1880.

		Per cent.
Ballast	$202,206.67	12.47
Cars, repairs of (in maintenance of way service)	17,487.34	1.08
Clerks	14,450.12	.89
Expenses on property	43,132.58	2 68
Firemen, tool, and watch-houses, repairs of	19,862.66	1 24
Frogs	23,970.96	1.42
Incidentals	21,223.82	1.32
Oil, tallow, waste, etc	1,407.14	.02
Road-bed, repairs of, labor and material	311,400.51	19.20
Snow and ice, removing	34,552.52	2.14
Spikes	33,486.08	2.07
Splices	37,711.51	2.33
Stationery and printing	6,428.07	.39
Superintendents and supervisors	48,817.80	3.04
Switches	60,129.34	3.71
Telegraph, repairs of	25,227.65	2.19
Tools and repairs of tools	37,667.44	2.33
Track, labor repairing	551,532.40	33.93
Watchmen	122,262.41	7 55
Total	$1,622,957.02	.....

The total is 11.55 per cent. of the whole operating expenses. The noticeable feature in these expenses is also that the two items of "road-bed, repairs of, labor and material" and "track, labor repairing" together amount to 53.13 per cent. of the whole. The greater part of the expenses of repairs of roadway and track, as some one has expressed it, goes to Irishmen and Italians. That is, it is the labor that is the chief item of cost. It is difficult to see how this can be diminished, unless some plan could be devised for keeping the road and track in repair by some system of contracts, which would make it to the interest of those directly in charge to get the greatest amount of work for the money paid in wages.

It would be interesting, too, to know what effect thorough ballasting and drainage has on the cost of maintenance of road. Some information in relation to it ought to be attainable on some of the roads which have recently been ballasted with stone, by comparing the cost for a few years before and after the ballasting was done. It would seem as though the cost of labor ought to be very materially diminished by a good foundation of broken stone to support the track. Be this as it may, it must be confessed that a careful examination of the different items of cost of repairs of roadway and track indicate that there is less chance of reduction here than anywhere else. The deterioration of the roadway and track due to the action of the elements, and to that of the rolling stock, seems to require a given amount of repair and renewal, and there is no way apparent by which these can be materially reduced.

There is one fact, though, that the Pennsylvania report of expenses indicates very clearly. This is, that the cost of keeping account of what becomes of the money expended is very little. Clerk hire in the road department of that line is considerably less than 1 per cent. of the cost of repairs of roadway and track. If the cost of rail and tie renewals and bridge repairs were included, as they are under the head of "maintenance of way" in the Pennsylvania Railroad report, the cost of clerks would be only a trifle over one half of 1 per cent. of the total cost of that department. As the Pennsylvania is currently believed to be more lavish in its expenditure for keeping accounts than any other company, the fact that what it costs on that line is such a very small proportion of the road department expenses indicates how hopeless it is to expect to make any material reduction by reducing the cost of clerk hire, or dispensing with such services. It is of course true that there may be unprofitable clerical work done, and that, like all other expenses, this should be carefully watched. The delusion which it is important to point out, and which is held by some railroad officers, is that the economy of the management of a railroad is in reverse proportion to the number of clerks and draftsmen employed. Even though this item of expense were entirely eliminated, it would make only a very slight impression on the whole expenses. If the cost of operating is to be materially diminished, we must aim at more important expenses, most of which have somewhat of a fungous character, in that they grow more rapidly in the dark than they do in daylight, where they can be seen. The expenses which are most to be feared are those of which no record is kept, and which are therefore incapable of comparison and analysis.

Some discussion of rolling stock expenses will be given in another number.

ENLARGING THE ERIE CANAL.

The improvement of the Erie Canal is a matter that attracts public attention from time to time in New York, as other transportation routes come forward and seem likely to get a large part of the traffic which the canal formerly commanded. The success of the railroads in competing with the canal has been partly the result of a great reduction in the cost of railroad transportation, so that a slight profit can sometimes be made at rates which the boats cannot afford to underbid, but also partly to the railroads in their competition with each other, frequently carrying for less than cost. Commonly it is assumed that the only rivals of the canal are the railroads, and that if it can be improved so as to carry at less than the *cost* by rail its success will be assured. But there is now other competition to meet which may be more formidable than the present railroad competition. The Mississippi River barges and the enlarged Welland Canal threaten to take from the canal what for years has been its chief traffic—namely, the grain brought to the seaboard for export and for consumption at New York. The traffic in more valuable merchandise has been for the most part long lost to the canal, and cannot be recovered by cheapness in rates, but only by a great increase in the speed of the boats. The important freights on the canal now are grain, lumber, coal, iron ore, pig iron and some manufactured iron, stone, lime and salt. Of these the St. Lawrence and the Mississippi routes compete only for the grain, and the railroad competition does not seem to diminish the shipments of the other articles by canal. Last year, for instance, when railroad rates were below cost, the canal carried more coal and lumber than ever before. If the boats get plenty of grain they do well, and the city of New York gains, because it is the terminus of the canal route.

In the course of investigations made last winter some one was wise enough to ask for the opinion of Mr. John G. Stevens, now President of the United New Jersey Railroad and Canal Company, who has had long experience with the Delaware & Raritan Canal, formerly a much more important transportation route than now (though now by no means idle), which is much larger than the Erie Canal. Mr. Stevens was asked as to the feasibility of deepening the Erie Canal one foot and raising its banks one foot, and of enlarging its locks so as to admit boats 210 ft. long.

In his reply to these inquiries (which we publish elsewhere) Mr. Stevens says that all these improvements are feasible, and that the deepening of the canal would be of very great advantage, though, owing to the impossibility of lowering the mitre sills of the locks and the tops of culverts, the deepened canal could not pass boats of deeper draft. But experiments made by him on the Delaware & Raritan Canal showed that to tow a boat drawing 6½ ft. through a section of the canal having but 7 ft. of water required *one-half more power* than to tow the same boat through a section of the canal having 9 ft. of water. Great stress on the importance of depth of water *under the boat* has heretofore been placed by Mr. Thomas Colden Ruggles, in various publications, including a letter written in May, 1879, and published in the report of the New York Produce Exchange the next year. He estimated that the cost per ton from Buffalo to New York, exclusive of tolls, with a steamer and barge would be $1.10 with 7 ft. of water, 98 cents with 8 ft., and only 63 cents with 10 ft.: and he would have his boats draw no more water in 10 ft. than in 8 ft., esteeming 4 ft. of water under the propeller wheel more advantageous than a larger boat.

But Mr. Stevens, though considering such an enlargement of the canal and locks possible, does not recommend it, because he does not think that the canal so enlarged could compete with the railroads, and believes that railroad transportation will become still cheaper than it now is.

The proposed length of lock Mr. Stevens says would be of no advantage for the boats now in use. The Delaware & Raritan canal had locks of precisely that length, but no one could be induced to build the long vessels for which they were intended. He believes that if the canal would pass boats of 1,000 tons capacity it could compete with the railroads, but to make such a canal would be too costly, and, moreover, he thinks the same result could be attained much more simply and cheaply.

His plan is to extend the locks 500 ft., so as to admit a tug with a tow of five boats, carrying 1,200 to 1,500 tons, and to raise the banks one foot and deepen the canal one foot, as proposed. The tow, he thinks, would have all the advantages of the large vessel, but would utilize the present equipment, require no very costly enlargement, and avoid keeping the motive power idle while the whole cargo was being loaded or unloaded.

This is certainly a very simple plan; but it will hardly be advisable to expend even the few millions that it would require on the Erie Canal to enable it to compete with the railroads, unless it will also enable it to compete with the St. Lawrence route and the enlarged Welland Canal. When vessels can load at Chicago and carry 40,000 or 50,000 bushels of grain

with very little delay from locks and the narrow channel of a canal through to Kingston or Montreal, it is probable that the Erie Canal will have to meet a more formidable competition than the railroads can offer, unless they carry for less than cost. And this suggests that the Erie Canal has suffered much less of late years from the reduction in the actual cost of transportation on the railroads than from the reduction of the price below cost by competition of the railroads with each other, in which competition they have not made greater profits, but less, on account of the freight they have taken from the canals. There can be no doubt that now, with the lightest grain traffic for five years, the railroads are making larger profits from grain than when they were destroying grain shipments by canal by their low rates last summer, and it is questionable whether the railroads have ever taken grain at rates unprofitable to the boats without losing by it. They *could* do so, probably, if the boats did not in turn compete for the freight. But the establishment of a rail rate which barely permits the canal boat to get a paying rate draws a large traffic to the roads and, if the total shipments are not large, increases the competition among the boats to such an extent as to bring down their rates to or below the cost by rail. If the crop is large the railroads do not need to reduce their rate to or below the cost by canal, and if they do it is because of competition with each other. When the railroads co-operate they never show any inclination to make rates which are unprofitable to the canal boats, for the reason that by so doing they reduce the profits on a large grain traffic to and from interior points, for which the canal does not compete. At present, through canal rates are low, and perhaps unprofitably low, it is not because of railroad competition, but because of the competition of the boats with each other. So little grain is coming forward that many of them cannot get cargoes, and that would still be the case just now if there were no railroads.

There is one very great advantage that an enlarged Erie Canal would have over the St. Lawrence route, provided it were enlarged enough to permit a great increase in the speed of the boats. Mr. Ruggles thought that with 10 ft. of water a steamer and barge would make five miles an hour, and so make the trip from New York to Buffalo in four days and four hours; while at present the boats requires 13 days. If freight shipped from New York by canal could be loaded on a propeller at Buffalo for the West within five days, the canal would get a very large part of the west-bound merchandise freight now carried by rail, and could get much higher rates on it than are given in the other direction, if the railroads would permit. Doubtless the effect would be to reduce rail rates (as low as they are now, possibly, under the disastrous contracts made last January), but a final adjustment would probably leave rates such that the canal would get a large share of the third and fourth-class freight. The St. Lawrence route cannot compete for these east-bound shipments, because they are made from New York and not from Montreal.

In this way an improvement of the Erie Canal, leaving it considerably more costly to move a ton from Chicago to New York than from Chicago to Montreal, might still enable the canal boats to compete with the St. Lawrence route. The vessels on the latter would make earnings only on the down trip, the canal boats on the up-trip also (if fast enough). The cost of the round trip, say, would be $1,000 by the Welland Canal and $1,200 by the Erie. The propeller taking grain through the Welland Canal, we will say, gets $1,100 for its cargo down, which is less than the cost of the trip on the canal, but the Erie tow gets $500 for a cargo back to Buffalo, then reduces the rates on the down cargoes to $900, or less than the cost by the Canadian route, and still has $400 profit from its round trip.

Such an improvement of the Erie Canal—that is, one making considerable speed possible—would be much more injurious to the railroads than one simply lessening the cost of carrying grain to the seaboard, as it would tend to take from them a traffic which, though much less in amount than the east-bound rail freight, can readily be made to pay more than twice the average rates on the latter, and a freight, moreover, which goes to fill cars that otherwise would have to be hauled west empty; that is, it would materially decrease earnings, but not permit any appreciable decrease in expenses.

The success of the canal, however, in an attempt to compete for any of the freight which now goes chiefly by rail, will probably be more difficult hereafter than heretofore, because after this year the number of railroads between New York and Buffalo will be doubled. There will be four where now there are but two; and the new lines may be more formidable competitors with the canal than the old ones, because they probably will not have (at first at least) so complete and extensive rail connections with the West as the older roads, and so will depend more upon the lake traffic, which is all that the canal now competes for. The new roads will doubtless have propeller lines running in connection with them, and there will be no fewer vessels running in connection with the old roads. Of the total lake traffic, therefore, we may expect a larger proportion to be carried by the railroads, and a smaller one by the canal.

If, however, an improvement of the canal can be made which will actually largely reduce the cost of transportation (including in the latter interest on the cost of the work), then it will be a legitimate competition, and the railroads will have no right to complain of it any more than owners of stage coaches, or passenger boats on canals, and the like had a right to complain of the railroads which sometimes ruined their business.

The benefit of an improved canal which would enable the boats to compete with the railroads would inure chiefly to the ports of Buffalo and New York, and chiefly to New York. If the improvement should cause a considerable decrease in the cost of transportation, of course the whole West would profit by it; but such a cheapening as would simply enable the boats to compete with the railroads might not and very likely would not go so far; and an extremely small reduction in the average rate actually received by the railroads during the season of navigation would probably make them cease to compete for the export grain, unless they had some other object in view than the immediate returns; and if they did so cease to compete, canal rates would probably be as high as now, because they are now probably as low as the bare cost of carrying by rail. (The present canal rate of 4½ cents a bushel for corn from Buffalo to New York is equivalent to 0.36 cent per ton per mile for the distance by the New York Central Railroad, and there are costly terminal expenses at the New York end of the railroad.)

To the city of New York it would doubtless be a great advantage to be the sole terminus of the cheapest route from the West. It is that, in the earlier days of the Erie Canal, which made it the commercial metropolis of the country, and the greater the difference in its favor the greater will be its share of the total export trade. The rest of the state, however, including the towns on the canal itself, except Buffalo, will gain very little by lower canal rates; they would hardly affect their traffic at all. And the parts of the state not on the canal would probably get no share of the benefit, and might even suffer from the improved canal. Certainly should it take the through grain traffic from the railroads, it would tend to prevent the gradual reduction of local rates which follows an increase in profitable traffic. The argument that by increasing the wealth of a part of the state it would reduce the rate of taxation throughout is one that has often been made by eminent men, but is discreditable to anyone with any knowledge of public affairs. Taxation is chiefly for the protection of property, and it increases generally with the wealth of the community taxed, and is more frequently at a higher rate than a lower one when the community is rich than when it was poor.

The question of the improvement of the canal, however, deserves more serious attention than it has yet received from the cities of New York and Buffalo, which, if the expenses were assessed according to the benefits, should pay nearly the whole cost of the improvement. Should the business be conducted in a rational way, so as to make the traffic through the canal pay the whole interest on the cost of the work and of its maintenance, then the question of benefit would take care of itself, and the only question would be whether the canal can be made to carry so cheaply as to again monopolize the export grain arriving from Western lake ports and places closely connected with those ports in face of the competition not only of the railroads, but of the Mississippi barges and the improved St. Lawrence route as it will be when the work is completed at the St. Lawrence rapids. The very small number of persons now living who have had experience with canals of different dimensions, especially experience in canal construction and operation, makes it unusually difficult to investigate the subject intelligently, and gives special value to the opinions expressed in Mr. Stevens' letter. He, with Mr. Ashbel Welch, Mr. John B. Jervis, Mr. Wm. J. McAlpine, and a few others, have had a wide and most valuable experience with canals, but it has been mostly when railroad competition was much less effective than it is now, and before the Mississippi barges and the enlarged Welland Canal had appeared as competitors at all. The effectiveness of the latter remains to be demonstrated, and the lack of an export trade makes it impossible to test it before next fall: and as it is not yet complete (no improvement of the St. Lawrence canals being opened yet), its full effect cannot be known for some time.

RECENT NEW YORK DECISIONS.

Recent volumes of New York court reports bring decisions on practical questions of railroad management, such as we are wont promptly to lay before our readers.

Lease of Road and Franchise.—In 1871 the officers of the Erie & Genesee Valley Railroad Company leased the road and franchise, for the full term of the charter, to an individual, one Woodruff, he agreeing in return to pay certain bonds which the corporation had previously issued. He immediately transferred all his right and interest to the Erie Railway Company, and it assumed his obligations in respect of paying the bonds. It thereupon held and operated the road. After Mr. Jewett was appointed Receiver of the Erie road, that company neglected to pay the interest on the Erie & Genesee Valley bonds, and then Woodruff brought suit to enforce payment. This suit the Erie Receiver contested on the ground that the lease of the road was invalid.

The Supreme Court sustained the Receiver's position, holding that a railroad company cannot transfer its entire property and franchise for its future corporate existence, unless some law of the state expressly authorizes it so to do. In New York no law has been passed permitting such transfer to be made to an individual; the extent to which the Legislature has gone in that direction has been to allow one company to make a lease to another company. There must be a responsible corporation in charge of the management of a road, not a mere private person. Accordingly Woodruff acquired no right by the lease, and could not transfer any to the Erie Company; hence the undertaking of that company to pay the bond was void for want of consideration. This decision may yet be reviewed in the Court of Appeals.

Exemplary Damages for Misconduct of Conductor.—In a suit by a man who was expelled from a car by the conductor, there was a dispute whether the sufferer was a fare-paying passenger or was trying to steal a ride; but it sufficiently appeared that he was thrown off very violently while the car was in motion, and was badly hurt. The judge told the jury that if they were satisfied the conductor acted with a reckless disregard of life, they might give extra damages—"smart money"—to punish the misconduct and prevent repetition of it.

The Court of Appeals declares this incorrect as against a railroad company. Granting that the conductor individually might be mulcted in smart money or exemplary damages, these cannot be awarded against the company unless the direction was in some way wilfully in fault, as by ordering the wrong or sustaining the conductor in it.

Loss of Baggage Among Connecting Roads.—The Supreme Court has decided an instructive case of loss of baggage. The circumstances were that a New Orleans man bought tickets in that city, for himself and family, for a round trip to Niagara Falls and back, over what is known as "the Mobile route." After visiting the Falls, he decided to extend the trip to New York city, and took the New York Central & Hudson River Railroad for that purpose, buying tickets at Niagara to New York and back. Thus, on completing his New York visit, he held Central tickets back to Niagara Falls, and Mobile route return tickets from the Falls to New Orleans. Showing these tickets to the Central Railroad baggage-master at the Grand Central Depot in New York city, he asked for checks for his baggage from New York through to New Orleans by the Mobile route from Niagara. The baggage-master gave checks, which the traveler accepted without looking at them, supposing they would carry his baggage by the Mobile route; in truth, however, they carried it over another route, and in course of the trip it was badly damaged. The traveler sued the New York Central & Hudson River Railroad.

The Court held that company not liable. The obligation of the Central & Hudson road, under the tickets it had sold, was only for transportation of the baggage back to Niagara Falls. This was safely accomplished; the trainmen at Niagara delivered the baggage in good condition to the next road in the connection. By New York law each carrier in a connection is responsible only for his own route and for safe delivery to the next carrier, unless he has specially agreed to be reponsible beyond. The baggage-master's giving through checks was not such an agreement, but was a mere act of courtesy, beyond his authority as baggage-master of the Central Company, and unsupported by any consideration moving to that company.

Liability to Injured Employé.—One of the yards of

the Erie Railway is drained by a system of small, open ditches or sluices, running across the tracks between the ties. They have stood several years, are in plain sight, and properly constructed; they do, however, render hasty walking about the yard somewhat dangerous. A switchman one day tripped among them, fell and was badly hurt.

The courts pronounced the company not liable, for the danger was not a latent one, known to the master but concealed from the employé; nor was it due to neglect on the part of the employer in construction. A railroad employé who accepts an engagement, with full opportunity to know the character and position of the company's works, takes the risk of whatever danger to him may be obviously involved.

Who are Fellow Servants?—Are the train-dispatcher and telegraph operators working at the station "fellow servants" with the conductor and trainmen? The Court of Appeals says, yes. The case was that of a collision on the Erie road, caused by the neglect of a conductor and a telegraph operator at Salamanca, which resulted in the death of a fireman on one of the trains involved. One of the trains was behind time, and, by the rules of the road, might move only according to special orders from the train-dispatcher. He sent an order to "wait." The telegraph operator ought to have delivered it to both conductor and engineer; he, however, notified the conductor only, relying on him to tell the engineer, which the conductor forgot to do. Meantime they, or one of them, reported to the train-dispatcher that the order had been duly delivered. The engineer, not getting the order, went onward; hence the collision.

But the operator and conductor were both careful, skillful men, suitable for their posts, and the rules were well devised and usually were well enforced and obeyed; and the Court holds that these facts protect the company from liability to any fellow servant of the negligent employés. Conductor and fireman are engaged in identically the same duty—that of moving the train. The service of a telegrapher engaged in communicating orders relative to movement of trains, though collateral to, is closely connected with it. The duties of two servants need not be precisely the same to make them "fellow servants;" it is enough that they are employed to bring about one result which depends on simultaneous and harmonious performance of their work.

An argument offered in the case was, that, as planning the time-table is a duty devolving directly on the company, for the wise performance of which it must be responsible to employés; so, when changes in it become needful, the company is responsible that they are correctly made. But the Court said that a company has a right, as toward employés, to vary from the regular time-table when special circumstances require. The necessity of doing so is one of the occurences which employés must expect as incident to the business. All that they can require from the management is that when changes are necessary due care and diligence shall be used in making them; that discreet orders shall be framed, and the execution of them entrusted to competent, suitable persons.

Law of the Bell and Whistle.—After a race at Jerome Park a crowd of persons walked homeward, their way lying across the railroad track. A down train had just passed, the dust and smoke of which obscured the track for some distance. The walkers looked along the road for any up train, but could see none, and straggled across the track; there was, however, an up train approaching, concealed by the thick-clouded air; it came upon them and one of them was killed. In his family's suit for damages his companions swore that they listened for bell or whistle but heard none. The trainmen all swore that both signals were punctually given.

It is common to say that one credible witness who swears he heard a signal outweighs a dozen who can only swear they did not hear it. But the New York Common Pleas says there is no strict rule of law to this effect, when the witnesses who deny the signal were persons possessing good hearing, were listening for the sound and were favorably situated for hearing it; and that the question was, therefore, properly left to the jury: Under the circumstances do you believe the travelers or the trainmen? The jury, as juries are apt to do when such questions are left to them, accepted the travelers' denial that the signals were given; and for the neglect, awarded the family a verdict.

Explosion of Boiler.—A boiler-bursting case decided in the Court of Appeals may well be mentioned, notwithstanding it did not occur in railroad business, since the principles would be applicable if a locomotive were to burst in consequence of gross mismanagement by the engineer, and were it to injure a bystander who had no business in the vicinity. The circumstances were that manufacturers of steam boilers placed a boiler just completed in the public street in front of the factory, and directed their superintendent to test it to 150 lbs. pressure. Disregarding this limit the superintendent began testing it to 200 lbs. Meantime a man passing through the street stopped to watch the process; he was told that the place was not a safe one, and was asked to leave; but he persisted in staying. The boiler burst, in consequence of the reckless, foolhardy manner in which the superintendent managed the testing; and the bystander was hurt. He sued the proprietors of the factory.

The Court held (1) that, notwithstanding the superintendent exceeded the express instructions of his employers, they were liable for the consequences of his carelessness, since he was acting in their business; but (2) that the bystander was not entitled to damages because his injury was "his own fault"—he was chargeable with contributive negligence in tarrying by the boiler after he had been told to leave.

Some New Trade Catalogues.

The literature of the arts and industries seems about to develop into a distinct field, consisting of special treatises issued by manufacturers, inventors and projectors of different kinds. Judging, too, from the number of applications which are made to have such work done, it appears as though there may soon be a new and profitable field in this direction for authors who have the requisite qualifications for such work. At present such trade circulars as the one issued some years ago by the Barnum-Richardson Company on "Salisbury Iron," by William Sellers & Co. on "Machine Tools," and by Miller, Metcalf & Parkin on "The Treatment of Steel," are among the best treatises in existence on the special subjects which they discuss. Considering the fact that books and pamphlets of this kind are prepared by persons who are specialists in the subjects of which they treat, it is a little surprising that there is not more literature of this kind which has a permanent character, and it may be that in the future the source to which people will look for a complete description of any art, invention or manufacture will be trade catalogues.

The above observations have been suggested by several specimens of books and pamphlets of this kind which have recently been sent to us, of which the following seem worthy of notice:

I. *The Catalogue of The American Duplex Ticket Company.*

This is a very beautiful specimen of printing. Samples of various kinds of tickets furnished by this company are printed in colors, with a short description of the method of using them. There are, for example, "conductors' train tickets, with or without drawback." These are furnished to conductors in books of 50 or 100 tickets each, for which he gives a receipt. These tickets have the names of stations printed on the margin and dates along the bottom. When a conductor collects a fare on a train he punches the names of the stations from and to which a passenger has paid. In some cases a table of figures is also given, which can be punched to indicate the amount collected. The tickets are printed in pairs, both of which are detached from the book after being punched. The conductor then gives one part to the passenger and retains the other. The latter is taken up before the end of the journey, excepting in cases where a "drawback" is allowed. To explain the nature of a drawback, it may be said that most railroad companies charge an extra sum if passengers neglect to buy tickets and pay fare on the train. This extra charge, or part of it, is in some cases refunded to passengers, on the presentation of the ticket which the conductor has punched at any ticket office of the company. The sum refunded is the drawback. Therefore, when drawbacks are paid, the conductor does not take up the part of the ticket given to the passenger; but this is left in his possession for presentation to an agent of the company. Experience has shown, though, that a large proportion of drawback tickets thus issued are never presented for payment; but as all tickets are numbered, and as the conductor cannot know which ones will be returned and which will not be, he is compelled to return all his duplicates or incur the risk of detection.

It is, of course, possible for a conductor to punch a ticket so as to record a fare for a shorter distance than that paid by the passenger, or to represent a half fare and then keep the difference between the amount received and that recorded on the ticket, taking his chances that the discrepancy will not be noticed by the passenger or discovered by the company. Or he might not give a punched ticket to the passenger. The risks of doing so are, however, very great. In the first place, a conductor can never be sure of his passengers. The most verdant-looking countryman or woman may be a detective, or the greatest swell the son of a director or officer. This ticket system, too, makes it possible at any time for an inspector to go through a train, when any discrepancy between the fares paid and recorded could be instantly detected. By this system of tickets a conductor must leave a record behind him, either of fares correctly or incorrectly recorded, or of neglect of duty, any one of which makes his detection much easier and more certain than it would be without such a system.

A great variety of tickets of this kind are made by the Duplex Ticket Company, and are illustrated in their catalogue. Every variety of color and design is used, and tickets are adapted to all kinds of travelers. Stop-over tickets with the stations numbered, sleeping and parlor car tickets and excess baggage tickets, all having the same features. The latter have the stations, amounts paid and number of pounds of baggage printed on them, and are punched by the station baggage master.

The whole catalogue is very interesting. If, however, a brief essay or dissertation on the general subject of the safeguards which railroad companies must provide to guard against peculation were added, it would increase the value of the book. As remarked before, it would seem as though it would be profitable to make books of this kind complete treaties on the subject to which they relate.

II. "*A Reference Book*" *of the Westinghouse Air-brake Company.*

This is a luxurious book from the press of Francis Hart & Co., with paper and press work of the very best quality. It is an illustrated description of the Westinghouse automatic brake. The engravings are beautiful specimens of the art of illustrating mechanism. This can be done by wood engraving more satisfactorily than by any other means.

The "Reference Book" contains a brief description of the brake and of its operation. Next a catalogue of parts with their names, a copy of the agreement made by the Westinghouse Air-brake Company with railroad companies which use the brake, and lastly in an appendix instructions for the care and working of the apparatus.

The illustrations show every part of the mechanism in the most complete way. They were made from drawings by Mr. Francis L. Clark, and were engraved by Albert Martin of Pittsburgh.

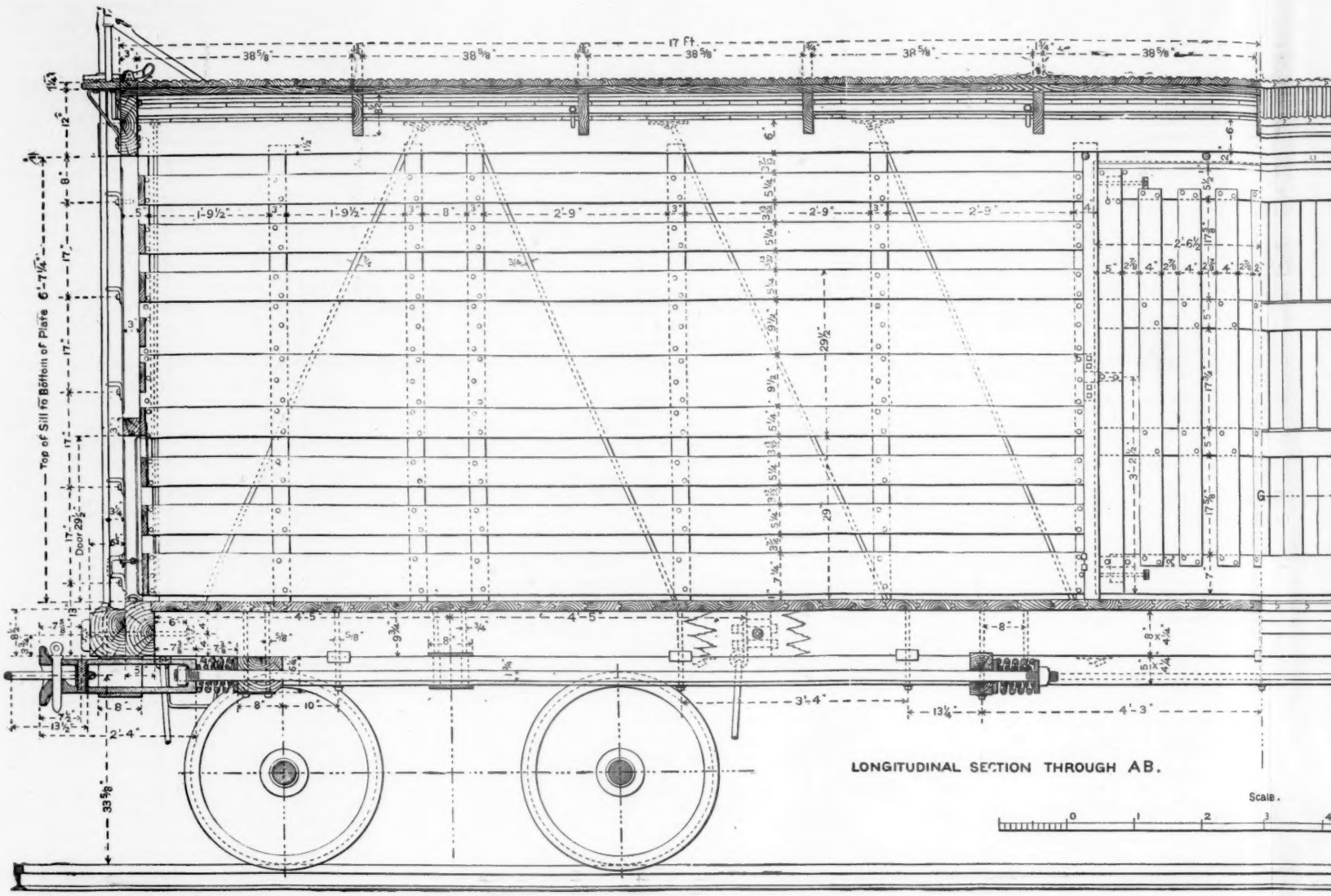
The first one represents in section the various parts of the apparatus, including the air-pump, main reservoir, engineer's brake-valve, drip-cup, triple-valve, auxiliary reservoir, brake cylinder and conductor's valve. These are brought near together and represent at a glance the whole brake apparatus. Plate A 2 is a side view and an inverted plan of a locomotive and tender, and an end view of a locomotive showing the brake apparatus. Plate A 3 is a side view and inverted plan of a passenger car with the brake attached. Plate A 4 is a large isometric view of an auxiliary reservoir and brake cylinder with the triple-valve shown in section. This gives a very good idea of the construction and the relation of these different parts. There are then sections of several different sizes of air pumps and of triple-valves, a section of the engineer's valve, others of the hose couplings and brake cylinders and other details, one showing the driving-wheel brake, and a large plate showing a train signaling apparatus. There is also a side view and inverted plan of a freight-car, showing the arrangement of a freight train brake, and other illustrations showing its details. All these illustrations are most beautifully engraved and printed, and they show as clearly as it is possible to show the construction of the various parts.

The verbal description of the engravings, though, seems to be rather inadequate to give a clear understanding of the construction and operation of the different parts. Books of this kind may generally be divided into three classes, those prepared by persons who can write well but can't draw, those which are the work of good draughtsmen who are poor writers, and finally that dismal class of productions which is the result of the efforts of those who can neither write nor draw. Sometimes, but rarely, we have a book on a mechanical subject which is the work of a person who can both write well and draw well. Such books at once become standards. Of the Westinghouse "Reference Book" it may be said that the graphical part is as near perfection as such work ever is, the printing, paper and typography are of the best, and doubtless the written description serves the purpose for which it was intended. Nevertheless, there can be no doubt that a plain, elementary description of the Westinghouse brake is much needed. If such a description was written in the clearest possible way, with the help of illustrations such as those contained in the "Reference Book," it would serve to give a good many trainmen a definite idea of the way the Westinghouse brake works, whose ideas about it are now very foggy. It should be said, though, that the book before us is evidently not intended for the purpose for which an elementary book is needed. In the preface the writers speak of "laying the book before our friends," so that it is evidently intended for those who are to a greater or less extent already acquainted with the brake.

III. *Descriptive Catalogue of Knowles' Patent Independent Condensing Apparatus.*—This is also a beautifully printed and elaborately illustrated catalogue of a system of independent air-pumps and condensers, which the Knowles Steam Pump Works are now supplying for stationary and pumping engines. Instead of an air-pump connected with the engine itself, the Knowles Company makes a pump which is driven by a separate steam cylinder, and which in connection with a jet condenser and feed-water heater can be used for converting any ordinary high-pressure engine into a condensing engine. The different varieties of this kind of apparatus which this company manufactures are very fully illustrated in this catalogue, which is tastefully designed, and the engravings, like those of the Westinghouse catalogue, are of the best.

It is claimed that the apparatus will save from 25 to 30 per cent. in fuel when applied to a non-condensing engine, or will give an increase of power of corresponding amount. The apparatus is represented very clearly by the engravings, which show it applied to an ordinary stationary engine, to steam pumps, pumping engines, etc.

Some fuller description of the condenser is needed, as its construction is not made clear to the ordinary mind by the engravings alone. The graphical illustrations of the book

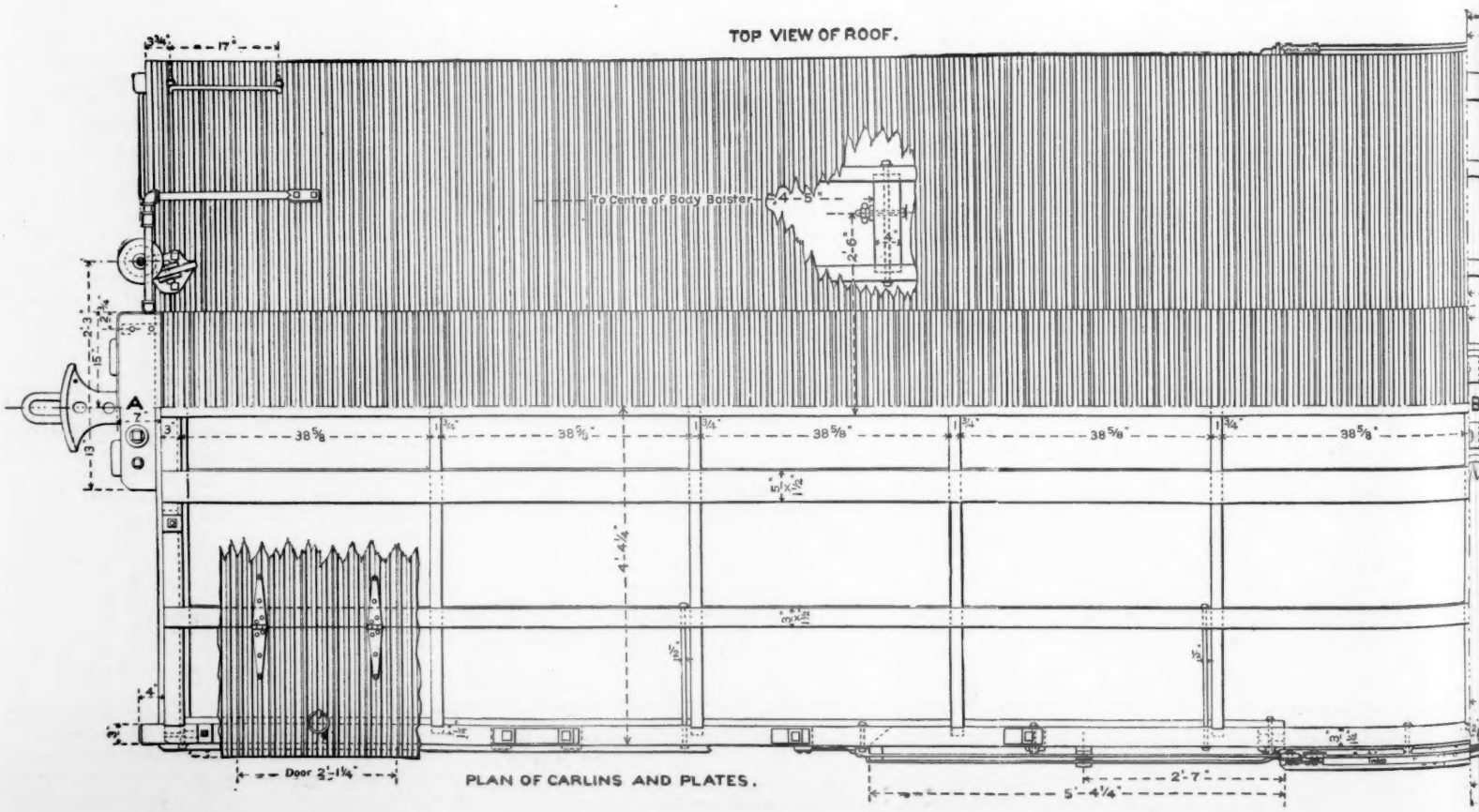


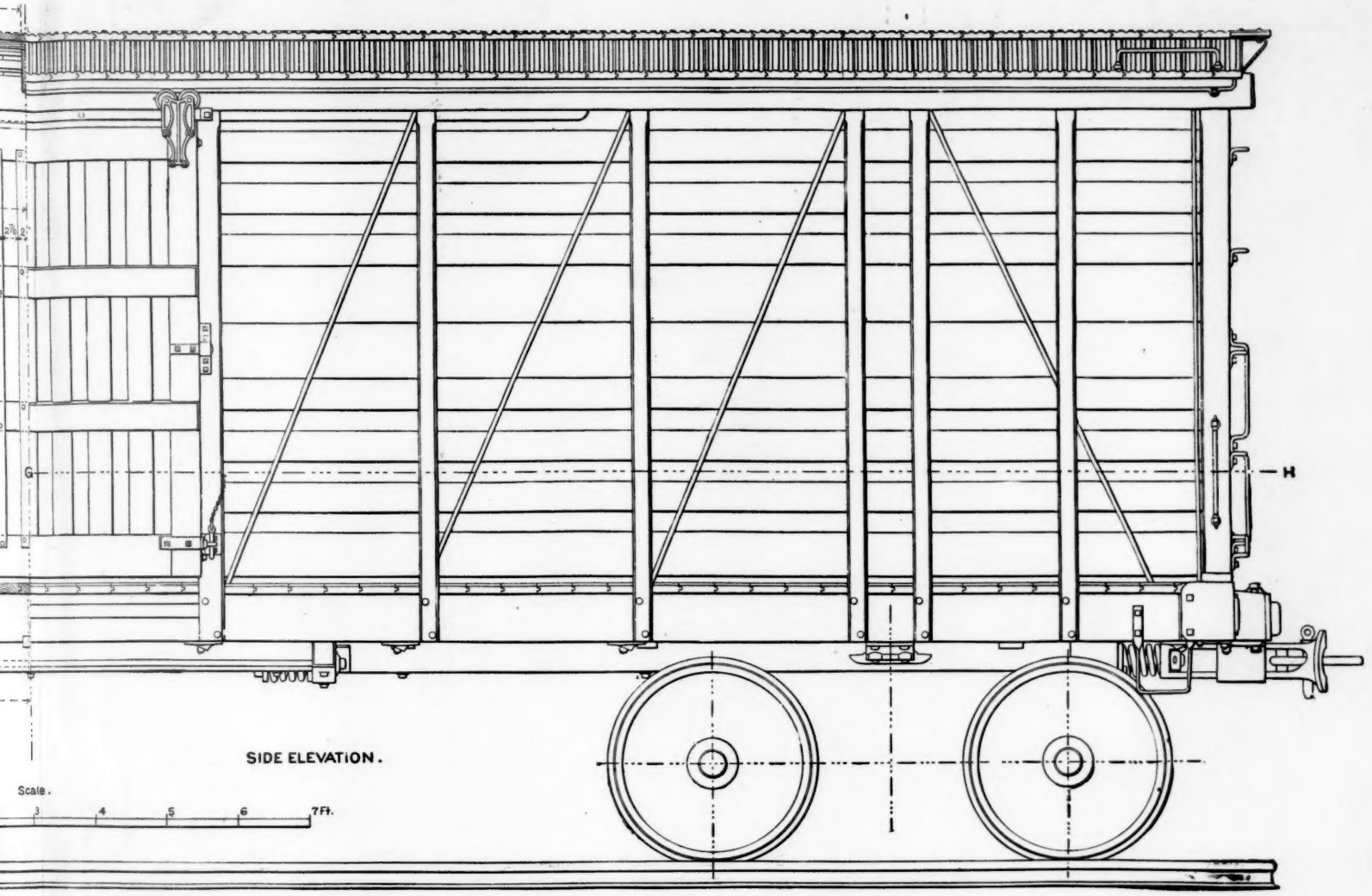
STANDARD 34-FT. C

FOR

NEW YORK CENTRAL & HUDSON RIVER RAILROAD

Leander Garey, Superintendent of





D 34-FT. CATTLE-CAR,

FOR

ER RAILROAD AND ITS CONNECTING LINES.

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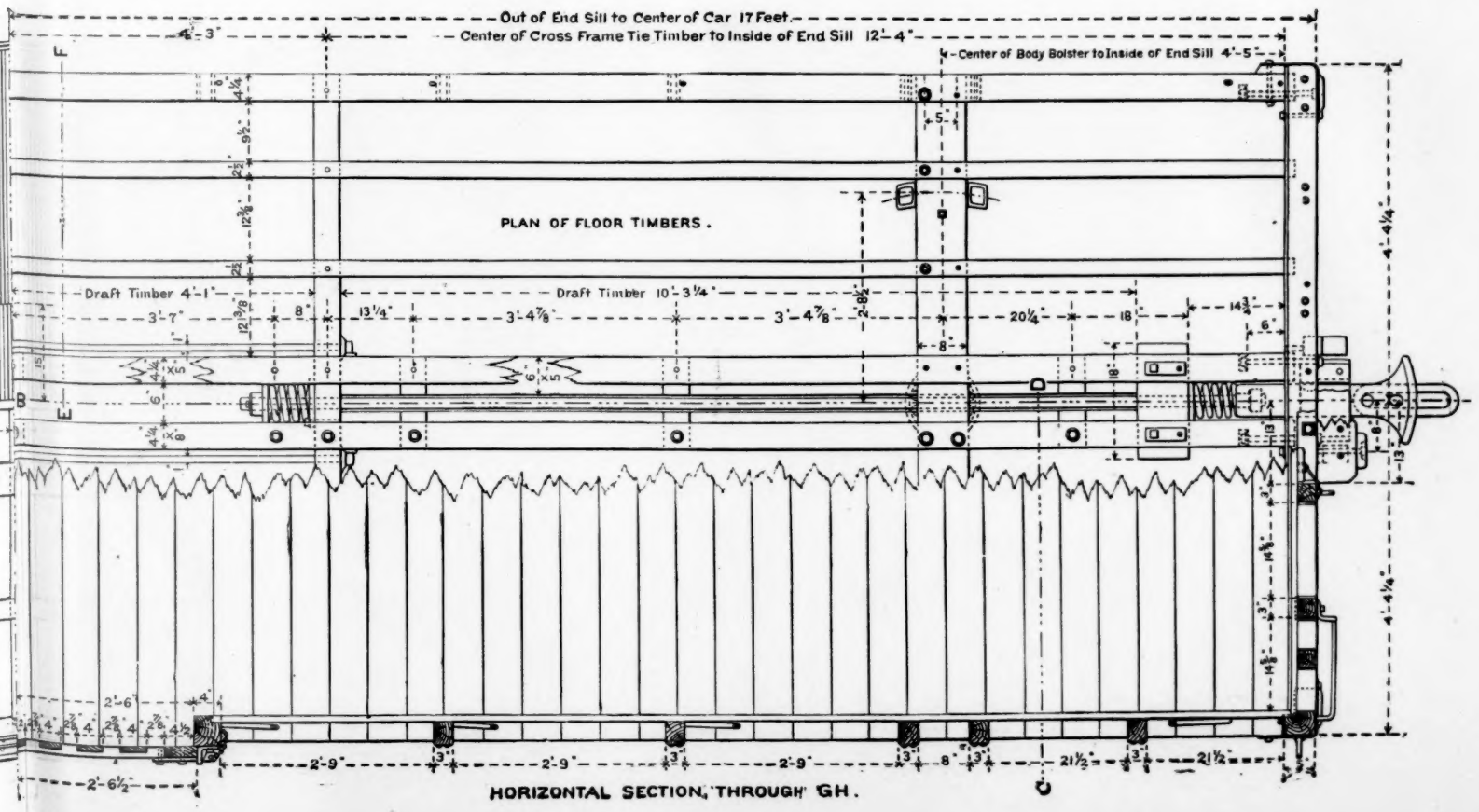
Out of End Sill to Center of Car 17 Feet.
Center of Cross Frame Tie Timber to Inside of End Sill 12'-4"
Center of Body Bolster to Inside of End Sill 4'-5"
PLAN OF FLOOR TIMBERS.
Draft Timber 4'-1"
Draft Timber 10'-3¼"
HORIZONTAL SECTION, THROUGH GH.

are better and more complete than the verbal description.

IV. *A Descriptive Circular of the Baker Car-Heater.*—This is less pretentious than the other catalogues noticed, but is neatly printed and engraved. It consists largely of the illustrations and description of the apparatus which was published in these pages some weeks ago, and therefore requires no extended notice. There is room for criticism, perhaps, of the engraving of the car on the title page, which neither represents the latest state of the art of car-building, nor that of wood engraving. The pamphlet illustrates, though, very clearly the construction of Mr. Baker's new heater, which is all that it is intended for.

April Accidents.

Our record of accidents for the month of April, given in full on another page, shows for the month a total of 81 accidents, by which 18 persons were killed and 61 hurt. Twelve accidents caused the death of one or more persons; 14 caused injuries, but not death, leaving 55, or 67.9 per cent. of the whole number, in which no injury to persons is recorded.

Seventeen of the killed and 30 of the injured were employés, while only one passenger was killed and 31 were injured. Of the entire number of 79 casualties to persons, 47, or 59.5 per cent., were to employés of the roads on which the accidents happened.

Compared with April, 1881, there was an increase of 18 accidents, but a decrease of four killed and of five injured. The month shows the smallest number of accidents for any month since June last, although they exceed in number those of April, May and June of last year.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:		
Rear collisions	27	
Butting collisions	7	
Crossing collisions	1	
		— 35
DERAILMENTS:		
Broken bridge	6	
Spreading of rails	5	
Broken wheel	2	
Broken axle	4	
Broken truck	1	
Accidental obstruction	1	
Cattle	2	
Open draw	1	
Misplaced switch	6	
Malicious obstruction	1	
Unexplained	16	
		— 45
Broken connecting-rod		1
Total		81

Five accidents were caused by trains breaking in two; four by the presence of cars run in some way from sidings upon the main track, in two cases believed to have been blown out by the wind; three by misplaced switches; one each by a flying switch, by mistakes in orders and by the wreck of another train.

The general classification of these accidents is as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road	..	11	..	11
Defects of equipment	5	7	1	13
Negligence in operating	29	7	..	36
Unforeseen obstructions	1	3		4
Maliciously caused	..	1	..	1
Unexplained	..	16	..	16
Total	35	45	1	81

Leaving out the unexplained derailments, this classification shows 55.4 per cent. of the accidents of what may be called the preventable class and 44.6 per cent. of the non-preventable class. It may be said of the last-named class, however, that probably a large part of them could be prevented by careful inspection. That the unexplained derailments may be largely attributed to defective track is shown by experience and observation.

As to time, there were 51 accidents in daylight and 28 at night, while in two cases the time is not definitely given. As usual the larger part of the accidents were in daylight, when the smaller number might be expected.

A division according to classes of trains and accidents is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains	1	14	1	16
To a pass. and a freight	10	..	..	10
To freight trains	24	31	..	55
Total	35	45	1	81
Casualties:				
Killed by	6	12	..	18
Injured by	19	42	..	61
Total	25	54	..	79

For the month collisions were the more fatal class of accidents. In this, however, there is no regularity. From the records of accidents some curious averages may be deduced, but the number of casualties is so often made up largely by one or two bad accidents that no definite conclusion can be reached as to the relative danger in different classes.

The worst feature of the record for April is the number of misplaced switches, causing six derailments and three collisions, nine accidents in all, or 11.1 per cent. of the whole number. These accidents, with the open draw and the crossing collision, are certainly the result of carelessness, and are without excuse. While in nearly all collisions carelessness or bad management may be traced, yet there are quite a number of cases in which valid excuses may be alleged by those upon whom the responsibility finally rests. But in the three classes named above there must be carelessness somewhere, either in the management or among the trainmen and other employés; and, in the latter case, the responsibility comes back upon the management, for loose discipline and negligence or good nature in high places will certainly be followed by carelessness among the body of employés. A thoroughly well-managed road should be like an army; and punishment should follow the man who leaves a switch open just as surely as it does the sentinel who sleeps on his post.

One malicious derailment is recorded, the result of an armed and desperate attempt at train robbery, in this case foiled by the quickness and courage of the trainmen and passengers

Another feature of the month was the number of broken bridges. There were six of these, one of which is recorded as a wooden trestle, two others as small wooden bridges, while of two we have no definite account. The sixth was a wooden bridge, which had been weakened and partly destroyed by a slow, smoldering fire.

It is worthy of note that not a single broken rail is recorded, although there are several failures of wheels and axles. It is very seldom that we have not at least one broken rail, even in summer months.

No less than four collisions were caused by the running of cars out upon the main track from sidings. In two of these the movement of the cars is attributed to high winds; in all of them it was probably the result of carelessness in failing to set the brakes properly when the cars were left.

The weather for the month was favorable for a spring month, as is shown by the absence of land slides, wash-outs and other accidents which generally appear at this season. There were no unusual storms and the weather was generally even and fair.

For the year ending with April the record is as follows:

	Accidents.	Killed.	Injured.
May	85	24	76
June	73	31	78
July	102	38	122
August	129	31	67
September	144	56	227
October	131	31	133
November	133	50	120
December	113	36	96
January	137	41	198
February	88	23	69
March	99	29	101
April	81	18	61
Total	1,315	408	1,348
Total, same months, 1880-81	1,364	385	1,673
" " " 1879-80	860	180	644

The averages per day were, for the month, 2.70 accidents 0.60 killed and 2.03 injured; for the year 3.60 accidents, 1.12 killed and 3.69 injured.

The average casualties per accident for the month were 0.222 killed and 0.753 injured; for the year they were 0.310 killed and 1.025 injured.

The averages per month for the year were 110 accidents, 34 killed and 112 injured, against similar averages of 114 accidents, 32 killed and 139 injured in 1880-81, and of 72 accidents, 15 killed and 54 injured in 1879-80.

The averages for the year make a better showing than for the preceding one, but are still very far behind those of previous years.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Northern Pacific.—Extended westward 22 miles to Gray's Bluff, Montana. The Pend d'Oreille Division is extended eastward 20 miles from Pend d'Oreille to Pack River.

New York, Chicago & St. Louis.—Extended from near Vermillion, O., east 31½ miles to Rocky River, from Brocton west to meet the line from Cleveland, and from the eastern end of the Brocton section east to Irving, N. Y., 41 miles, making 72½ miles in all.

Oregon Railway & Navigation Co.—The *Baker City Branch* is extended east by south to the first crossing of the Umatilla, 13 miles.

Stony Clove & Catskill Mountain.—Extended from Stony Clove, N. Y., north to Tannersville Junction, 2 miles.

Valley, of Ohio.—Extended southward to Sparta, O., 8 miles.

This is a total of 137½ miles of new railroad, making 2,991 miles thus far this year, against 1,386 miles reported at the corresponding time in 1881, 1,502 miles in 1880, 570 miles in 1879, 385 miles in 1878, and 393 miles in 1877.

TRUNK-LINE SHIPMENTS WESTWARD make a strong contrast with the eastward movement of freight. The latter is the lightest for years, while the westward movement is enormously greater than in any previous year. It will be remembered that west-bound freight this year is carried under contracts made at the beginning of the year to cover shipments until July, by which the first-class rate is 80 cents per 100 lbs. from New York to Chicago, instead of 75 cents, as last year, and rates on the lower classes are similarly reduced, though not quite to the same extent. On the whole, the rates are not more than half as great this year as last. The effect in stimulating shipments has been surprisingly great, for the circumstances of the country are such that with the same rates we should not expect shipments to be much greater this year than last, when up to this time they were nearly the same as in 1880, but from New York were 40 per cent. more than in 1879 and 50 per cent. more than in 1878. But in the first four months of this year we learn that the shipments from New York to the West have been 54 per cent. more than last year, 56 per cent. more than in 1880, and 120 per cent. more than in 1879. The increase from the other ports—Boston, Philadelphia and Baltimore—we understand to be large, but much smaller than this. The increase this year we understand to be in freight of the lowest class. In these four months last year the canal was not open, and therefore the increase cannot be by diversion from that route; but when rates were maintained as then considerable shipments were made by steamers to be forwarded by the New London Northern, the Chesapeake & Ohio and the New York & Western, which could then offer lower rates than the trunk lines and still make some profit, which they certainly cannot do now. Were it not that the cars have to be moved West, whether loaded or empty, the trunk lines themselves would be better off without any of this immense west-bound freight. Though the amount of it has been 54 per cent more than last year the gross earnings from it have been probably nearly a quarter less, and the net earnings—but that is a subject too painful to speak of.

There probably never was a time before when the west-bound movement was so nearly equal to the east-bound, the great increase of the former coinciding with the great decrease in the latter. At New York it is not always easy to get cars (coming from the West) for the merchandise shipments; but a great share of the freight coming from the West now, and going over some part of the trunk lines, does not reach the seaboard, the freight being consigned to interior points; and these it is, for most of the roads, more convenient to load with coal than to forward empty to New York for merchandise, which hardly pays for loading and unloading.

The most important conclusion to be drawn from the present great westward movement of freight is that the bad harvests last year have not permitted an increase in the consumption of goods in the West. We might know this from the increase in imports; but that has been not nearly so great as the increase in trunk-line shipments—for the first three months of the year, 20 per cent., while the increase in shipments were more than 50 per cent.

CHICAGO RAIL SHIPMENTS EASTWARD for the week ending May 13 for three years have been:

	1880.	1881.	1882.
Tons	24,485	36,046	22,364

The receipts this year are 38 per cent. less than last year, and 5,909 tons (20 per cent.) less than the week before this year; and, with the exception of the week of the switchmen's strike, they were the smallest of any week since 1879. Of these shipments, 11.6 per cent. were by the Chicago & Grand Trunk, 17.7 by the Michigan Central, 13.3 by the Lake Shore, 36.4 by the Fort Wayne, 9.5 by the Panhandle, and 11 per cent. by the Baltimore & Ohio. The Grand Trunk at last has something like its average proportion before last March, but this seems to be of little advantage to the Vanderbilt roads, which carried but 31 per cent. of the whole, against 49 per cent. in the pool of 1880, while the two Pennsylvania roads carried 45.9 per cent. of the whole, against 33 per cent. in the pool. There is an enormous falling off on the Vanderbilt roads since January, for then not only were the total Chicago shipments more than three times as great, but these roads had an unusually large proportion of the shipments. For instance, in the week ending Jan. 28, when the shipments were largest, the Michigan Central carried 19,809 tons and the Lake Shore 23,996; in the week ending May 13 but 3,958 and 2,974 tons respectively; that is, in the January week the Michigan Central carried *five times* as much and the Lake Shore *eight times* as much out of Chicago as in the May week. As the more the roads carried the poorer they were last January, there was no reason for welcoming the large traffic then; but as there is a profit in the business now, the fall of the traffic below the normal percentage would be regrettable were it not agreed to have the apportionment which is yet to be made cover shipments since March 13. One of the reasons of the smaller percentage on the Vanderbilt roads is the great falling-off of the grain and flour shipments, while the decrease in the provision shipments, of which the Pennsylvania has always had the larger part, has been comparatively small. Another reason, doubtless, is the transfer of the Erie's freight lines to the Fort Wayne.

For the week ending May 20 the shipments of freight billed from Chicago to the East (the above including what is billed through as well as what is billed from Chicago) were 13,637 tons, against 17,848 tons the week before, and 42,529 tons in the corresponding week of last year, when they were increased by the forwarding of freight delayed by the switchmen's strike. The shipments last week were much smaller than in any other week of the few years during which a record has been kept. There is no prospect of any considerable improvement until the winter wheat begins to come forward, which at Chicago will not be much before August.

THE FIRST LOCOMOTIVE IN AMERICA is a somewhat numerous machine, if one may believe all the stories in the newspapers, and statements of aged men who saw it. Its latest appearance is consequent to an article on "The First Train between Albany and Schenectady," published lately in the Minneapolis *Tribune*. This has brought out a letter from Mr. J. Van Buren, now of Clarksville, Ga., who says that he, as Superintendent of Clute & Bailey's machine works in Schenectady, helped set up the "first locomotive in America," that being one built by George Stephenson, and imported, not by the Mohawk & Hudson, but by the Schenectady & Saratoga Railroad Company, in the year 1832. But three years before, Aug. 8, 1829, the "Stourbridge Lion" made its experimental trip on the Delaware & Hudson Canal Company's Railroad, at Honesdale, Pa. Nov. 2, 1830, the first locomotive built in America, the "Best Friend," made its trial trip at Charleston, S. C., on the South Carolina Railroad, and Mr. Nicholas W. Darrell, who was a machinist in Charleston, when the locomotive arrived, was employed to run it, and claimed to be the first locomotive engineer in America. In 1869 Mr. Darrell was still living in Charleston.

But Mr. Van Buren is not only mistaken as to these facts, which were doubtless unknown to him, but also as to the time a locomotive was put on the Mohawk & Hudson Railroad, which he says was after 1832. The "De Witt Clin-

ton," an American locomotive built for this road, made its trial trip on it July 5, and on Aug. 9 took an excursion train of five or six cars between Albany and Schenectady. It is a lithograph made from a black paper silhouette of this train that we see hung up in railroad offices and elsewhere, with the title, "The First Railroad Train in America," though at the time trains had been running for eight months on the South Carolina Railroad. The silhouette was cut by Mr. Wm. H. Brown, famous for his skill in making silhouette profile portraits, who was a passenger on the train. He has been to great pains to deny that this was the first American railroad train, having written a book on early American locomotives, in which he brings out the facts as to the locomotives that had been used here before. He also says that the silhouette he cut, and afterwards gave to the Connecticut Historical Society, did not include the whole train; it represents but two cars, while he says there were five or six. The text on the lithograph says that the locomotive was the "John Bull," and was imported. The "John Bull" came out about a year after the "De Witt Clinton" was put on the road, but another English locomotive, the "Robert Fulton," arrived shortly after the "Dewitt Clinton." Those who have copies of the engraving should correct its title. It bids fair to descend to history popularly known as the first American railroad train.

PENNSYLVANIA RAILROAD EARNINGS AND EXPENSES during the month of April have been for ten successive years:

Year.	Net earnings.	Expenses.	Net earnings
1873	$3,613,045	$2,454,309	$1,158,736
1874	3,217,701	2,103,433	1,114,268
1875	2,775,836	1,690,339	1,085,497
1876	2,862,722	2,025,847	836,875
1877	2,346,704	1,765,148	581,556
1878	2,509,806	1,632,509	877,297
1879	2,630,023	1,598,995	1,031,028
1880	3,484,367	1,992,785	1,495,582
1881	3,760,372	2,104,562	1,655,810
1882	3,855,850	2,536,539	1,319,311

Compared with last year there is an increase of $95,478 (2½ per cent.) in gross earnings, an increase of $431,977 (20½ per cent.) in working expenses, and a *decrease* of $336,499 (20⅛ per cent.) in net earnings. The gross earnings are larger than in any previous April; the net earnings the smallest since 1879. The working expenses are larger than in any month of any year since June, 1873. The increase in expenses since 1879 is $937,544, or 59 per cent. The gross earnings last April have not been exceeded since the months of heaviest Centennial travel (September and October, 1876,) except in October, 1880, May, 1881, and March this year, and then but slightly. The whole falling off in profits is due to the great increase in expenses.

For the four months ending with April the earnings and expenses have been for six years:

Year.	Gross earnings.	Expenses.	Net earnings.
1877	$9,184,566	$6,400,006	$2,784,560
1878	9,446,089	6,100,062	3,346,027
1879	10,312,564	6,103,785	4,208,779
1880	12,794,681	7,189,570	5,605,111
1881	13,889,508	8,069,704	5,819,804
1882	14,448,219	9,559,415	4,888,804

Compared with last year there is an increase of $558,711 (4 per cent.) in gross earnings, an increase of $1,489,111 (18½ per cent.) in working expenses, and a *decrease* of $931,000 (16 per cent.) in net earnings. Compared with 1880, there is an increase of $1,652,000 in earnings and of $2,370,000 in expenses.

The lines west of Pittsburgh and Erie, which last year for the four months had profits of $1,409,311 over rentals and liabilities, this year show a *deficit* of $57,987. The decrease in the profits accruing to the Pennsylvania Railroad Company in the four months thus appears to be $2,408,298, which is about 3½ per cent. on the stock then outstanding. The result of the working of the Western system in the month of April was a profit of $17,047 this year, against a profit of $338,593 last year.

A DISCRIMINATION IN RATES is complained of by a number of Chicago grain shipping firms, who have published over their names a protest "against the discrimination practiced by the agents of the New York, Lake Erie & Western Railroad in giving Hancock, Beel & Co. special or cut rates on grain from Chicago, thereby depriving us of profits on business of which, under fair competition, we could get our proportion." We know nothing of the truth of the charge made by these firms, but if the discrimination of which they complain does exist, they have a right to complain of it, and by uniting publicly in a complaint, they are pretty sure to get their complaint attended to. The definite statement of complaints against railroads is always desirable; complaints of a general nature are usually only expressions of suspicions, and do not give much opportunity for investigation or remedy. If those who have fault to find with the railroads would say definitely what they want done or not done, it will do much to prevent what is wrong, and to introduce just ideas of what is right and wrong in railroad practice; for in refusing what was requested, the railroad officers could, and if there was any considerable support to the request would, in a manner be compelled to give their reasons.

MILWAUKEE RAIL SHIPMENTS EASTWARD are not usually reported, but have recently been published from the official records for the period from March 13 (the date of the present tariff) to May 6, during which they amounted to 42,100 tons, of which the Detroit, Grand Haven & Milwaukee road carried 17,020 tons (40.4 per cent.), the Chicago, Milwaukee & St. Paul, 16,405 tons (39 per cent.), and the Chicago & Northwestern, 8,675 tons (20.6 per cent.). During these eight weeks, while the Milwaukee shipments were 42,100 tons, the Chicago shipments were 265,721 tons. The rates are the same from Milwaukee as from Chicago, and the traffic has very little direct importance to the Northwestern and the St. Paul, their haul being but 85 miles, and but one-twelfth the distance from Milwaukee to New York, while the rate on grain and flour the whole distance is now but $5 per ton.

APRIL IMMIGRATION shows an enormous movement, truly, but a smaller increase over last year than we have had heretofore, the number arriving being 104,274, against 95,351 last year. For the ten months of the fiscal year ending with April, the increase over last year is 98,717, or 22 per cent. There is a large increase in the arrivals from Great Britain in April (5,795, or 31½ per cent.), and of Scandinavian arrivals (2,874, or 33 per cent.), but there is a decrease of 2,316 in the number of German immigrants. More than one-third of the whole were from English-speaking countries, about three-eighths from German-speaking countries, and one-ninth were Scandinavians. In the third week of May the arrivals at New York were about 25,000.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Concord, annual meeting, in White's Opera-house in Concord, N. H., May 30, at 11 a. m.

United New Jersey, annual meeting, in Trenton, N. J., May 30, at noon.

Central Railroad of New Jersey, meeting for election of directors, June 23. Transfer books close June 2.

Railroad Conventions.

The *Master Car-Builders' Association* will meet in annual convention in Philadelphia, June 13.

The *Yardmasters' Association* will hold its annual convention in Baltimore, June 14.

The *Master Mechanics' Association* will hold its annual convention at Niagara Falls, beginning on June 20.

Dividends.

Dividends have been declared as follows:

Chicago, Burlington & Quincy, 2 per cent., quarterly, payable June 15. Transfer books close May 25.

Northern (New Hampshire), 3 per cent., semi-annual, payable June 1. Transfer books closed May 15.

Lehigh Coal & Navigation Co., 2 per cent., semi-annual, payable

Norfolk & Western, quarterly, 1 per cent., payable June 15. Transfer books will be closed from May 31 to June 10.

The Master Mechanics' and the Master Car-Builders' Association.

The *Master Car-Builders' Association* will begin its sixteenth annual convention in Philadelphia, on Tuesday, June 13. The Committee of Arrangements have selected the Continental Hotel as the headquarters of the Association during the meeting. Members wishing to engage rooms will communicate with the proprietor of the hotel.

The *American Railway Master Mechanics' Association* will hold its fifteenth annual convention at the International Hotel, Niagara Falls, beginning on Tuesday, June 20. Members are requested to secure rooms through the Chairman of the Committee of Arrangements, Mr. F. M. Wilder, Susquehanna, Pa., or through the Secretary of the Association.

JOINT MEETINGS OF THE ASSOCIATIONS.

The Committee appointed by the Master Mechanics' Association last year to confer with a like committee from the Master Car-Builders' Association has made a report recommendingthat the two Associations meet next year at the same time, and that a joint committee be appointed with authority to decide upon the place of meeting, Saratoga, Niagara Falls, Indianapolis, Pittsburgh and Chicago being suggested for consideration.

Trunk Lines Advisory Commission.

The advisory commission held sessions last week in Louisville and Toledo. At Toledo an elaborate argument was presented by the Secretary of the Produce Exchange, Mr. D. B. Wood, in favor of allowing competition in rates to the seaboard, and against all pooling of freights. Statistics of the grain trade of Toledo were also presented. The commission will give no more hearings, but will now proceed to prepare a report.

Young Men's Christian Association, Railroad Branch.

The first railroad branch of the Young Men's Christian Association of Chicago was established, and a Railroad Secretary employed, in 1877.

Three railroad branches have been in operation for two years. Two of them have libraries, two have bath-rooms, two have lunch counters, and one has lodging rooms. A secretary gives his whole time to the work at each branch, and has an assistant or janitor. The following figures show something of the work at the three rooms for the year 1881:

During the year 75,625 men have used the rooms; 12,169 visits have been made by the secretaries to employés in cabooses, engines, switch and flag houses, round houses, shops, depots and offices; 791 visits to families; 524 visits to sick and injured men; 234 meetings have been held, with an attendance of 8,855. There has been steady growth in the work. The interest taken by employés has encouraged railroad managers to aid in its financial support.

Earnest requests come for the establishment of new branches and for increased facilities for those now in operation.

The management of this department of work has recently been strengthened by adding thereto an advisory committee consisting of Messrs. H. E. Sargent, W. K. Ackerman, L. M. Johnson, J. B. Brown, O. S. Lyford, S. R. Callaway, W. F. Merrill, C. G. Hammond, J. W. Midgley, Marion Hughitt and John Thomas.

At a recent meeting this advisory committee after hearing reports on the work done among railroad men adopted the following:

"*Resolved*, That we believe that the work of the Young Men's Christian Association among railroad men in Chicago has proved of great advantage to the men and to the companies supporting it. Employés who had lost positions through dissipation have been restored to the service and to their families. Saloons that were leading railway employés to ruin have been closed by the withdrawal of this patronage. Employés who formerly supported saloons now spend leisure time in the reading and library rooms. The attendance of employés at theserooms and their use of the libraries, classes for instruction and other facilities is steadily increasing. All this means better service and greater security for passengers and property. The expenditure is legitimate and yields large returns.

"*Resolved*, That, in the judgment of this Committee, railroad branches of the Young Men's Christian Association should be established at or near the foot of Lake street, and at or near the junction of Twelfth street and Third avenue, or at pointsmore convenient for the employés of roads centering at those points, and that railroad companies represented at each point be solicited to contribute to their support.

"*Resolved*, That the railroad companies not now contributing to the support of railroad branches of the Young Men's Christian Association of Chicago be asked to make appropriations to enable the Railroad Executive Committee to extend and improve the work by establishing branches at points yet unoccupied, and to do more and better work at all points, and that those now contributing be asked to consider whether more work is not needed at new points where they have employés, to which they can reasonably give increased appropriations.

Religious Conference of Railroad Men.

A conference in the interest of Christian work among rail road men was to begin sessions at Springfield, Mass., May 25. Addresses Friday evening were expected from Mr. A. L. Hopkins, Vice-President of the Wabash, and Gen. J. H. Devereux and Gov. J. Gregory Smith were expected to attend.

Rules for Repairs of Interchanged Cars.

The following invitation has been addressed to all railroads in the United States and Canada by Mr. Leander Garey, President of the Master Car-Builders' Association.

"In compliance with the twenty-first section of the 'rules governing the condition of and repairs to freight cars, for the interchange of traffic,' I would beg to request the attendance of an authorized representative of your company at a meeting to be held at the Continental Hotel, Philadelphia, at 3 p. m., Wednesday, June 14, 1882, for the purpose of revising the rules above referred to."

Car Accountants' Convention.

The Railway Car Accountants' Association met at Hotel Vendome, Boston, on May 23. About 60 railroads and lines were represented, as follows: Allegheny Valley, W. D. Shields; Baltimore & Ohio, D. F. Maroney; Blue Line, G. A. Gilman; Boston, Hoosac Tunnel & Western, J. W. Burnham; Burlington, Cedar Rapids & Northern, F. L. Misner; Buffalo, New York & Philadelphia, N. W. Halsey; Chicago & Northwestern, F. M. Luce; Chicago, St. Paul, Minneapolis & Omaha, F. M. Luce; Central Iowa, C. E. Mallory; Canada Southern, C. H. Alport; Chicago & Alton, H. H. Lyon; Canada Southern Railway, R. H. Smith; Cincinnati, Indianapolis, St. Louis & Chicago, B. F. Sipp Cleveland, Columbus, Cincinnati & Indianapolis, C. J. Fellows; Central Railroad and Banking Company of Georgia, W. F. Bass; Columbus, Hocking Valley & Toledo, George C. Mather; Commercial Express Line, C. W. Cushman; Central Railroad of New Jersey, Samuel Manning; Delaware & Hudson Canal Company, E. H. Ewings; Erie & North Shore Dispatch, A. McCrea; Eastern, E. A. Nutting; European & North American, W. H. Harlow; Evansville & Terre Haute, M. C. Trout; Erie & Pacific Dispatch, M. S. Robinson; Fitchburg, F. B. Shepley; Fall Brook Coal Company, C. K. Minor; Flint & Pere Marquette, S. Keller; Grand Trunk, John G. Hunt; Green Bay, Winona & St. Paul, Glenn Richardson; Great Western Dispatch, C. O. Gwatkin; Hoosac Tunnel Line, O. B. Squire; Indianapolis & St. Louis, T. A. Brock; International & Great Northern, S. Wilcox; Lake Shore & Michigan Southern, G. H. Weeks; Lehigh Valley, A. P. Blakeslee; Lake Erie & Western, Frank Shaw; Louisville, New Albany & Chicago, S. O. Parker; Michigan Central, D. D. Davis; Midland Line, C. W. Cushman; New York, Pennsylvania & Ohio, A. W. Davis; Northern Central, J. A. Wilson; National Dispatch Line, F. S. Stranahan; New York, Lake Erie & Western, J. L. Harris; Ogdensburg & Lake Champlain, R. P. Tobey; Philadelphia & Reading, A. J. Speese; Pennsylvania Railroad, J. A. Keesbery; Pittsburgh, Ft. Wayne & Chicago (P.a Co.), J. A. Keesbery; Pittsburgh, Cincinnati & St. Louis, A. W. Eastman; Pittsburgh & Lake Erie, H. C. Johnson; Railway Car Association, C. W. Cushman; Red Line, F. B. Hannis; Richmond & Danville, W. A. Moody; Railway Clearing House, E. B. Hill; Rome, Watertown & Ogdensburg, C. W. Cushman; Standard Oil Company, H. R. Payne; Sioux City & Pacific, J. E. Marsh; Terre Haute & Indianapolis, H. G. Sleight; Union Line, James A. Smeigh; Wabash, St. Louis & Pacific, C. P. Chesebro; White Line, J. N. Balme.

The meeting organized by the election of the following named officers: President, A. W. Davis, New York, Pennsylvania & Ohio; Vice-President, F. B Hannis, Red Line; Secretary, F. M. Luce, Chicago Northwestern; Assistant Secretary, H. H. Lyon, Chicago & Alton. An invitation was received and accepted from the Boston & Hingham Steamboat Company for an excursion down the harbor. The subjects discussed on Tuesday were:

"The Coupon Tracer—What benefits have been derived from its use; what additional labor, if any, has its use demanded; what are the practical advantages over the old form of tracer, as proven by its use during the past year; will the information gained by its use justify a continuance during the coming year?" "Junction Reports—To what extent have they been used; have the practical results proved the system to be of value; has the resolution passed at Cincinnati been faithfully carried out; if of value, what can be done to make their use general?" "Clearing House System—What advantages does it possess over the car accountant's office; will it pay a road to maintain a car accountant's office and also a membership in the clearing house; which of the two systems is preferable?"

Wednesday meetings were held day and evening It was decided to continue the use of the coupon car tracing system another year. It was also voted to advise all roads to adopt what are called junction reports of cars. The clearing house system was discussed and a committee of five was appointed to investigate the matter. The convention adjourned Wednesday night.

PERSONAL.

—Mr. J. C. Gregg, an old civil engineer, who, when last heard from, was engaged on the Texas & Western Railroad at Beaumont, Tex., has not been heard from since Feb. 22. Information concerning him will be gladly received by his friends, and may be sent to the *Railroad Gazette* office.

ELECTIONS AND APPOINTMENTS.

Cleveland, Delphos & St. Louis.—The following officers have been chosen: President, A. G. Hatry, Pittsburgh; Vice-President, C. A. Evans; Secretary, J. D. Callery; Assistant Secretary, C. W. Risley; Treasurer, J. Boehmer; General Manager, I. H. Burgoon, Delphos, Ohio.

Flint & Pere Marquette.—At the annual meeting, May 17, the following directors were chosen: Henry C. Potter, Henry C. Potter., Jr., William L. Webber, East Saginaw, Mich.; Abram G. Brown, Utica, N. Y.; Lewis Pierce, Portland, Me.; Wm. W. Crapo, Francis Hathaway, Loum Snow, New Bedford, Mass.; Alfred M. Hoyt, Jesse Hoyt, Cornelius D. Wood, New York.

Florida Tropical.—Mr. D. E. Maxwell is Chief Engineer, with headquarters at Ocala, Florida.

Housatonic.—Mr. W. H. Yeomans has been appointed Superintendent in place of L. B. Stillson, resigned. Mr. Yeomans was for many years a conductor on the Hartford, Providence & Fishkill road, and afterward Superintendent of the Connecticut Western.

Indiana, Bloomington & Western.—Mr. H. M. Brunson has been appointed General Passenger and Ticket Agent of the whole line, having previously occupied the position on the Sandusky Division.

Jacksonville & St. Augustine.—The officers are: President, A. M. Lyons, New York; Vice-President, W. J. Lawton, Jacksonville, Fla.; Secretary, Wm. S. Sneden, Jacksonville, Fla.; Treasurer, Walter Lyons, St. Augustine, Fla.

Louisville, Evansville & St. Louis. — Col. Jonas H. French has been chosen President, and Mr. Webster Snyder, well-known as General Superintendent of the Union Pacific during its construction, General Manager. The board of directors, since the changes lately noted, stands as follows: Jonas H. French, John Goldthwait, H. C. Nutt, W. B. Strong, James H. Wilson, J. T. Burr, H. D. Hyde, Charles J. Paine, William T. Hart, F. B. White, all of Boston; William Heilman, W. F. Nisbet, Evansville, Ind., and George B. Buchanan, Louisville, Ky.

Midland North Carolina.—Col. J. W. Andrews, late Assistant Superintendent, has been appointed Chief Engineer and General Superintendent, in place of Major J. B. Yates, resigned.

Nashua, Acton & Boston.—At the annual meeting in Boston, May 16, the following directors were chosen: Samuel N. Bell, Joseph B. Clark, Francis B. Hayes, James W. Johnson, Benjamin A. Kimball, John C. Moulton, Dana Sargent, Henry C. Sherburne, Frederick Smyth, J. Thomas Vose, Wm. P. Wilson. The board elected John C. Moulton President; John B. Goodrich, Clerk; F. D. Cook, Treasurer.

New York, Lake Erie & Western.—Mr. G. W. Bartlett is appointed Road-Master of the Delaware Division in place of R. W. Ware, resigned. Mr. Bartlett has been Supervisor of a division for several years.

Ohio Central.—Mr. John E. Martin, formerly President and Superintendent of the Evansville & Terre Haute, has been chosen Vice-President of this company. Mr. G. G. Hadley, formerly General Manager, is now Assistant General Manager. Mr. Martin has issued the following circular: "The Vice-President having assumed the duties of General Manager, heads of departments will hereafter report to him. Mr. G. G. Hadley, Assistant General Manager, will give special attention to the coal department. All communications in regard to the production and sale of coal should be addressed to him. Mr. W. H. Vandegrift, Superintendent, will transfer his his headquarters to Bucyrus, O., and take personal charge of the transportation department, the office of Train Master being abolished."

Portage, Westbourne & Northwestern.—Mr. John Ortton's title on this road is General Manager and Superintendent of Construction, not General Superintendent, as stated last week. His office is at Portage la Prairie, Manitoba.

St. Cloud, Mankato & Austin.—At the annual meeting in Mankato, May 10, the following directors were chosen: W. H. Officer, H. W. Page, W. H. Twiford, Henry Foster, Austin, Minn.; J. H. Baker, Mankato, Minn.; W. M. Campbell, W. T. Bonniwell, W. J. Ives, Hutchison, Minn.; C. A. Gilman, St. Cloud, Minn. The board elected W. T. Bonniwell, President; C. A. Gilman, Vice-President; J. H. Baker, Secretary; H. W. Page, Treasurer.

St. Paul, Kasson & Iowa.—L. E. Cowdrey is President; Wm. Wheeler, Vice-President; L. G. Nelson, Secretary; and Geo. B. Arnold, Treasurer, of this newly incorporated Minnesota company.

Saratoga, Mt. McGregor & Lake George.—Mr. John McGee is Chief Engineer and Superintendent. He has had wide experience on railroads, both in this country and in Peru.

Schenectady, Albany & North Adams.—The directors of this new company are: R. P. Flower, New York; Henry J. Boyle, J. Wesley Smith, S. H. Sweet, George H. Turner, William J. Weaver, Albany, N. Y.; A. D. Collins, J. Delehant, M. Milligan, Troy, N. Y.; John D. Campbell, Schenectady, N. Y.; S. E. Haskin, Corning, N. Y.; A. L. Farr, R. L. Martin, Chicago.

Shamokin, Sunbury & Lewisburg.—S. P. Wolverton, of Sunbury, is President; Andrew H Dill Treasurer and Wm. Lorenz, of the Philadelphia & Reading, Chief Engineer.

Southwestern Association.—Mr. E. D. Moore, who has been Auditor of the Association, has been appointed General Agent at Kansas City, in place of Mr. C. C. Church, resigned.

Union, of Indianapolis.—The board has elected W. R. McKeen President in place of D. W. Caldwell, resigned.

Wabash, St. Louis & Pacific.—Mr. W. L. Durbin is appointed Train-Master and S. C. Bristol Chief Operator of the St. Louis Division. Offices in Moberly, Mo.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Third week of May:				
Denver & Rio Grande	$135,341	$122,135	I. $13,206	10.8
Chicago, Mil. & St. Paul	367,000	364,485	I. 2,515	0.7
St. Louis & San Francisco	52,100	72,600	D. 21,400	30.0
Second week of May:				
Ind., Bloom. & Western	$42,134	$37,480	I. $4,654	12.4
Ohio Southern	6,111	4,153	I. 1,958	47.2
No. Pacific and leased lines	475,974	445,852	I. 30,122	6.7
Wab., St. L. & P.	213,495	174,841	I. 38,684	22.1
Chi. & N. W.	409,809	379,808	I. 30,001	8.0
Four months to April 30:				
Buff., Pitts & West	$201,087			
Net	$127,980	49,188	I. 78,992	160.0

Grain Movement.

For the week ending May 13, receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past six years.

Year.	Northwestern receipts.	Northwestern shipments. Total.	By rail.	P. c. by rail.	Atlantic receipts
1877	2,506,649	1,997,738	758,450	37.9	2,575,025
1878	4,896,219	4,115,751	1,866,111	45.4	6,359,345
1879	3,510,383	6,226,747	1,982,501	31.8	4,549,127
1880	4,987,754	4,963,869	1,250,589	25.2	6,152,638
1881	3,729,414	4,099,344	1,039,250	25.6	3,647,404
1882	2,592,591	2,894,323	965,360	33.4	2,535,112

The receipts of the Northwestern markets are nearly a third less than in the corresponding week of last year and less than in any corresponding week since 1877. They are also a million bushels less than the week before and are the smallest for four weeks. The shipments of these markets are also smaller than in any corresponding week since 1877, and they are the smallest for six weeks this year. The rail shipments, compared with last year, are but 74,000 bushels less, while the river shipments are 351,953, and the lake shipments 779,178 bushels less. The river shipments this year were 90,936 bushels, or 3.1 per cent. of the whole; last year they were 442,889 bushels, or 10.8 per cent. of the whole. The Atlantic receipts were 1,100,000 bushels less than in the corresponding week of last year, 3,600,000 less than in 1880, and are the smallest for nine years with the exception of 1875. They are 409,000 bushels less than the week before, but with that exception are the largest since canal navigation closed in the fall.

Of the Northwestern receipts, Chicago had 51.1 per cent., St. Louis, 15.7, Toledo 9.2, Peoria 8.1, Milwaukee 6.6, Cleveland 4.5, Detroit 4.5, and Duluth 0.3 per cent.

Of the Atlantic receipts, New York had 57.5 per cent., Boston 14.7, Baltimore 8.5, Montreal 7.7, Philadelphia 6, New Orleans 5.4, and Portland 0.2 per cent. The effect of the opening of navigation is seen this week for the first time in the Montreal receipts, which are as great as the aggregate for three months previous. Baltimore receipts, though very small, are the largest since March, but Philadelphia's are the smallest for five weeks.

Exports for the week ending May 16 were 650,741 bushels of grain and 46,377 barrels of flour this year, against 3,114,802 bushels of grain and 101,802 barrels of flour in the corresponding week of last year.

For the week ending May 20 receipts at four Eastern ports for three successive years have been:

Bushels.	New York.	Boston.	Phila.	Baltimore.	Total.
1882	1,278,221	147,013	150,800	110,467	1,686,501
1881	3,959,091	276,315	643,550	597,053	5,476,009
1880	1,522,858	300,160	1,089,700	435,452	3,348,170
P. c. of total:					
1882	75.8	8.7	9.0	6.5	100.0
1881	72.3	5.9	11.8	10.9	100.0
1880	45.5	9.0	32.5	13.0	100.0

Philadelphia and Baltimore together received 15.5 per cent. of the whole this year, against 22.7 last year, and 45.5 in 1880.

For the week ending May 20 receipts and shipments at Buffalo were:

	Receipts.	Shipments.
By rail	253,400	389,400
By water	1,550,650	1,062,270
Total	1,804,050	1,451,670

Thus, only 14 per cent. of the receipts and 27 per cent. of the shipments were by rail. In 1880, when rail rates were higher than now, the rail shipments from Buffalo at this season averaged more than 1,250,000 bushels per week.

Coal Movement.

Coal tonnages for the week ending May 13 are reported as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Anthracite	428,752	430,162	D. 1,410	0.3
Semi-bituminous	76,636	96,273	D. 19,637	20.4
Bituminous, Penna	63,120	46,228	I. 16,892	36.7
Coke, Penna	57,185	50,315	I. 6,870	13.7

Anthracite trade continues very dull. Shipments westward are large, but are mainly going into stock at lake ports.

The Cumberland strike continues. The operators have notified the men that if they do not return to work in a few days, miners will be brought in from other places.

The coal tonnage of the Kansas City, Ft. Scott & Gulf road for the four months ending April 30 was 107,005 tons.

The coal tonnage of the Pennsylvania Railroad for the week ending May 13 was: Coal, 153,606; coke, 57,185; total, 210,791 tons. The total tonnage this year to May 13 was 4,024,293 tons.

Chicago and Milwaukee Receipts.

Receipts for the first three weeks of May for four successive years have been:

	1879.	1880.	1881.	1882.
Chicago:				
Grain, bush	5,837,173	9,531,210	4,858,916	4,572,210
Flour, bbls.	194,668	161,963	233,666	164,462
Hogs, No	331,329	411,375	301,212	337,599
Milwaukee:				
Grain, bush	1,590,184	1,102,890	803,603	498,299
Flour, bbls	131,180	118,425	196,228	184,000
Hogs, No	10,178	13,146	15,299	23,654

The grain receipts this year are not very much less than last year, but there is a great decrease from the other two years. Including flour (reduced to grain) the receipts of the two places have been in bushels:

Week to—	1879.	1880.	1881.	1882.
May 7	3,188,208	3,539,347	2,125,698	2,700,822
" 14	2,669,115	3,661,644	2,087,824	2,100,476
" 21	2,036,350	4,694,855	3,383,520	1,837,290
Three weeks	8,893,673	11,895,846	7,597,042	6,638,588

Thus the decrease from previous years in the receipts for the three weeks and for the last year has been:

	Less in 1882 than in—		
	1881.	1880.	1879.
Three weeks, bush	958,454	5,257,258	2,255,085
Per cent. of dec.	12.6	44.2	25.3
Week to May 21, bush	1,546,230	2,857,565	1,199,060
Per cent. of dec	45.7	60.9	39.5

The decrease is greatest in the last week, it will be seen, and the receipts have decreased from week to week this year, while in 1881 and 1880 they increased from week to week. A still greater decrease may be expected for the next five weeks, because receipts last year were then extraordinarily large.

A Texas Pool.

A telegram from Galveston, May 16 says:

"From authentic sources it is learned that a pooling arrangement was effected at a recent meeting of the Texas railway managers at New Orleans. The pool embraces all the competitive points in Northern Texas—the International & Great Northern Texas, Texas & Pacific, Galveston, Houston & Henderson, Houston & Texas Central, Morgan's Louisiana & Texas road, the Louisiana & Western and Texas & New Orleans roads being included in the pools, and the Galveston, Harrisburg & San Antonio and Gulf, Colorado & Santa Fe declining to go in. The meeting held at Galveston to-day to influence the Santa Fe officials was a signal failure, that corporation claiming they now carry 75 per cent. out of the city of Galveston. War will follow, resulting in the cutting of rates from competitive points."

Sales of Railroad Lands in Minnesota.

The following report of the State Auditor shows the amount of lands sold and contracted for by the railroad companies and the various land offices of Minnesota. The total assessment of lands last year amounted to 18,430,789 acres. To this are to be added 1,247,118 acres, which become taxable this year, making a total of 19,677,907 acres of taxable lands:

RAILROAD LANDS.

St. Paul & Chicago	52,734.20
St. Paul, Minneapolis & Manitoba (lands deeded)	14,132.07
St. Paul, Minneapolis & Manitoba (lands contracted)	122,413 30
E. Lawrence, special Commissioner Northern Pacific and St. Paul, Minneapolis & Manitoba	65,840.49
Northern Pacific	10,661.70
Dakota & Hastings	28,901.96
Minnesota Central	4,039.30
St. Paul & Sioux City	15,682.76
Sioux City & St. Paul	3,721.69
Western Railroad	5,751.10
Southern Minnesota Railroad Extension Company	2,933.28
Southern Minnesota	76,467.57
St. Paul & Duluth	16,127.45
Winona & St. Peter	27,558.67

Crop Prospects.

The May report from Michigan says that much damage was done to the winter wheat by cold weather in April, but in spite of that the condition of the crop in the whole state is 33 per cent. better than last year.

In Northern Minnesota and Dakota the wet weather greatly delayed the sowing of Spring wheat, but, except in the northern part of the Red River valley (where population is still small), sowing was generally completed by the 10th. In many counties there is an enormous increase in the acreage sown, comparatively little land being under cultivation last year; but on the whole, on the lines of the Northern Pacific and the Manitoba road there is supposed to be an increase of something like 25 per cent. in the wheat acreage. There are parts of the immediate valley of the Red River which were overflowed too long to be sowed, but the total area of plowed land so flooded is probably not large enough to have much effect in the aggregate wheat production of Minnesota and Dakota.

In California rains have continued unusually late, doing great good in those counties where the winter rains were insufficient to make a crop. One authority claims now that the crop is likely to be not only as large as last year (28,000,000 bushels) but even as large as that of 1880 (34,000,000 bushels), or even larger.

The April report of the Department of Agriculture on winter is based on returns received in the first half of the month, and is especially valuable for its statistics of acreage.

In the Atlantic states, from Maine to Virginia, inclusive, the area sown is reported to be about 4,000,000 acres, which is a trifle less than last year. In the Cotton states there is an increase of 26 per cent., from about 3,200,000 to 4,000,000 acres; but this large area, in ten large states, extending from Virginia to Mexico, is but one-tenth more than the wheat acreage in the single state of Illinois in 1880, and an average yield there would make the product of these 4,000,000 acres less than 28,000,000 bushels, or less than Missouri's production in 1880. The condition of the wheat in all the Southern states at the time of the report was extraordinarily good, probably 10 per cent. above the average, but as the average yield there is less than seven bushels to the acre, this would not give 3,000,000 bushels more than an average yield. The great winter wheat district in the Mississippi valley is reported to have about 17,000,000 acres this year, which is about 500,000 acres less than last year. This gives east of the Rocky Mountains nearly the same acreage this year as last.

The average condition of the crops of this whole section at the time of the report was 104 per cent. of an average, against 85 per cent. last year, and this difference of condition is probably equivalent to 60,000,000 bushels. But it must be remembered that the crop can improve or depreciate in condition after the 1st of April. This year during April it doubtless grew worse to a considerable extent in Indiana and parts of Ohio, and to some extent in Illinois and Michigan, while reports are all favorable for the South and for Kansas. But last year in April and May the average condition for the whole country fell from 85 to 74, and there has been nothing like that so far this year. The crops in the South will soon be harvested. We must have extraordinarily unfavorable weather for the next six weeks to make this crop as poor as last year, when the reduction in yield was far greater, on the average, in winter than in spring wheat; but the present prospect is that the crop will be lighter than the extraordinarily large one of 1880.

Snow fell, in some places to a depth of four inches on the morning of May 23 northward to Manitoba, west of the Mississippi, and there were very severe frosts before and after; but the late season had generally prevented the corn's coming up, and small grains were not injured, and the chief damage was to garden and small fruits. There is still plenty of time for corn. The cold is an additional hindrance to sowing in the few fields in Northern Dakota and Minnesota which remained to be seeded, however, and the late cold and floods will be a great drawback in Manitoba, where, however, there is too little ground under the plow to make any considerable effect on the total crop, and where what is most needed is favorable weather for breaking prairie for next year's crops, which is best done a little later in the season.

Northwestern Immigration.

The Chicago *Tribune* of Sunday last says: "The Lake Shore road brought in seven car loads of immigrants yesterday. The Grand Trunk had 22 cars of immigrants and baggage bound for Manitoba. During the week the Michigan Central brought in 4,811 on special trains and about 1,500 on regulars. A special this afternoon will bring in 612 more, all destined for the Northwest. The immigrant traffic on the Fort Wayne road for the week aggregated 4,500 naturalized citizens."

The same paper the day before said: "The immigration movement is exceedingly active. Within the past forty-eight hours the Michigan Central brought in 2,800 European emigrants, the Lake Shore 720, the Fort Wayne about 1,500, and the Grand Trunk about 400. The Baltimore & Ohio have 1,600 on the road, who will arrive here to-morrow morning. The great bulk of these hardy sons of Northern Europe will settle in Northern Minnesota and Dakota."

Indianapolis Passenger Agents' Meeting.

A telegram from Indianapolis dated May 18 says: "No measures were adopted at the meeting of the general passenger agents to-day as to the charges of rate cutting against the local agents of the Indianapolis, Bloomington & Western, the Cincinnati, Indianapolis, St. Louis & Chicago, and the Vandalia. Nevertheless the agreement of Jan. 1 to punish rate cutting was not set aside, but rather strengthened so as to be more binding. All of the agents who had violated the agreement stated to the satisfaction of the meet-

ing that they were justified in their action. H. C. Deering was elected Secretary of the Association in place of W. H. Prouty, resigned."

THE SCRAP HEAP.

Car Notes.

The new shops of the Fulton County narrow-gauge road at Lewiston, Ill., are building 21 box and 15 stock cars for the road.

The Jones Car Works at Schenectady, N. Y., are building the cars for the new Saratoga, Mt. McGregor & Lake George road.

H. K. Porter & Co. in Pittsburgh are building several locomotives for the new Saratoga, Mt. McGregor & Lake George road.

The Rogers Locomotive Works in Paterson, N. J., recently shipped several six-wheel switching engines, with tenders, to the St. Louis & San Francisco road.

Bridge Notes.

H. S. Hopkins & Co. in St. Louis have the contract for the bridge over the Arkansas River at Pine Bluff, Ark., on the Texas & St. Louis road; it will cost $205,000. They are also building several smaller bridges for the same road.

The Houston Bridge & Manufacturing Co. has organized at Houston, Tex., with $50,000 capital stock, to build bridges. The directors are R. J. Alexander, E. J. Heiner, S. C. Oliver, B. C. Simpson and C. C. Wiggins.

Iron and Manufacturing Notes.

W. D. Kelly & Sons recently put their Grant Furnace, in Ironton, O., into blast. They have been repairing Centre Furnace, and will start it up in about two weeks.

The Brownsport Furnace property in Decatur County, Tenn., will be sold at public sale in Nashville, Tenn., July 1. The property includes 12,000 acres of ore and timber land, bordering on the Tennessee River, a blast furnace 42 ft. high and 12 ft. bosh, with blowing engines in good order, and all necessary buildings. The ore is brown hematite and there is abundance of limestone. Terms of sale are one-fourth cash, the balance in 6, 12, 18 and 24 months.

May Snow Blockades.

As long as trains are blockaded by snow within 15 miles of Laramie—in the "beautiful month of May"—there is certainly little reason to boast about the weather of 1882, thus far. Fourteen years ago, Monday, the Union Pacific was blockaded by the beautiful near that city, and that same thing occurred on Tuesday, though the track was soon cleared. The *Boomerang* states that freight trains Nos. 6 and 10 stuck in the snow between Tie Siding and Red Buttes that morning, and were several hours getting out—two engines being somewhat damaged by bucking the beautiful. Master Mechanic Galbraith sent out a snow plow and two engines ahead of the express, to thoroughly clear the track and prevent its filling up again.—*Ogden (Utah) Herald, May* 11.

Wrought-Iron Car Wheels.

The Patent Shaft and Axletree Company, of Wednesbury, England, which make the wrought-iron steel-tired car wheels used on the Boston & Albany Railroad, and illustrated in the *Railroad Gazette*, May 12, have appointed, as exclusive sales agents for the United States, Messrs. Budd & Ellis, of Nos. 105 John street, New York, and 10 Oliver street, Boston.

The Mechanical Superintendent of the London, Brighton & South Coast Railway (England) writes in reference to these wheels: "We have nearly 8,500 pairs of your wheels under our rolling stock, and we have not changed any carriage or wagon tires that have been put on during the last twelve years."

Cleveland Bridge and Car Works.

This company, by H. M. Claflen, president, made an assignment May 20, in the Probate Court, to H. F. Sweetzer and W. H. McCurdy for the benefit of its creditors. The assignees gave a bond of $25,000, with W. J. McKinnie and S. O. Griswold as sureties, and will pay outstanding indebtedness and complete existing contracts. The wages of the workmen are three months overdue, and the assignees are authorized to borrow money, if necessary, in order to pay them. The works are reported to have on hand large contracts which will be profitable, but which have already required such a large expenditure that payments could not be met as they fell due.

Apparatus for Measuring Bridge Strains.

Professor Fränkel, of Dresden, has invented an apparatus for determining the strains on the different members of a bridge construction, which shows graphically the lengthening or shortening of cords fastened to the parts under strain, and affords means of comparing the actual with the calculated strains. Tests of various bridges made with the apparatus have shown that in general there is a pretty close agreement between the observed and the calculated elastic change only in simple systems, while in combined systems differences as great as 50 per cent. have been found. Professor Steiner, of Prague, expects to make an important improvement in this apparatus.

The Automatic Freight Brake.

The American Brake Co., of St. Louis, reports that out of 387 freight cars equipped with the automatic freight car brake, which were inspected in the St. Louis & San Francisco yards in St. Louis during April, only 28 required repairs, and these only slight repairs which were made in the yards. The cars had been in service various periods, from one to 14 months, and had been subjected to the rough usage which freight cars generally receive.

The Widest Gauge.

The widest gauge yet reported is out in Washington Territory, where the have a road of 8 ft. gauge. It is a logging road, running back from the Skagit River, and is laid with wooden rails 8 by 8 in. The cars used are large, and are carried on 12 wheels; the wheels are 9 in. face, with double flanges.

A Gate-Keeper's Trials.

There is a position sought after by men which yields more trouble, and kicks, and curses to the hour than any or all other positions combined. That position is held by the gatemen at the Central station in this city. They are sure of curses either from the inside or outside of those gates. Their orders are strict—*never* to let a person through without a ticket. If they obey, they are looked upon as unaccommodating by passengers, and treated accordingly. If they disobey, their heads are cut off. If they seek the happy medium, they catch it from both ways. Then there are the questions—hundreds, thousands, millions of them every day. They must be better instructed than the conductors themselves, for they are only expected to know about their own trains. The poor gateman must know just what time *every* train arrives and departs, where and for how long it stops at each station. At every train they must answer questions about this order: "Is this the Buffalo train?" "Is this the Batavia train?" "Where does this train go?" "Does it stop at Spencerport?" "Will I have time to get a sandwich?" "Can I get my baggage checked when I get to Buffalo?" etc., etc. Is it any wonder that in running a daily gauntlet of interrogaters every day that they sometimes give a semi-gruff answer? Or is it not a wonder that they do not sometimes catch a man by the beard and draw a coal-scuttle over his physiognomy and tell him to "go to now," or to "soak his head" for being such an everlasting and troublesome bore? —*Rochester (N. Y.) Democrat and Chronicle.*

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—This company has negotiated a sale of $5,000,000 of 6 per cent. bonds in London, which was the first large sale of new American securities that has been effected there for a long time.

A telegram from Atchison says:

"The intelligence that the Fe road had succeeded in their loan in London quickens the railroad pulse in this centre. The fact that this gigantic corporation had laid off 2,000 men from active employment in less than two weeks between here and Old Mexico was seriously considered. In conversation with contractor J. S. Fiske, who operates the entire improvement force in Atchison, he stated that, although he had not received express orders for such action, the intimation was that he might prepare for work."

Atlantic & Pacific—President Henry C. Nutt has recently returned from a trip over the line, and reports that the road is now completed to Cañon Diablo, 311 miles west of the Rio Grande River, where the dry chasm is being spanned by an iron viaduct 520 ft. long and 254 ft. high. The structure is designed to carry the heaviest consolidated engine moving at a speed of fifty miles per hour. It was to be finished by May 25, after which tracklaying westward, in the direction of the Colorado River, 254 miles, will be resumed and carried forward at the rate of two miles each day for the remainder of the season. For a distance of 100 miles west from Cañon Diablo the route is graded and ready for the rails. The rails for over 200 miles of track have been delivered along the route. The track is entirely of steel and the bridges entirely of iron. The road will be completed to the Colorado River early in 1883. The arrangements between the Atlantic & Pacific and the Southern Pacific regarding the junction of the roads at the river provides for the bridging of the stream by the former company.

Augusta & Knoxville.—The company has decided to issue $200,000 of second-mortgage 7 per cent. bonds to purchase equipment.

Baltimore & Ohio.—The contract for the grading and masonry of the Curtis Creek branch has been let to John Lyons, of Baltimore. The branch will be 4.8 miles in length, branching from the main stem at Camden junction; passing through the village of Brooklyn, Anne Arundel County, and thence in almost an air-line to the lower part of the creek below Baltimore, where vessels can land which cannot get up to Locust Point. There will be a trestle bridge erected by the company across the Patapsco River, but the other small bridges and stone arches come under the contract. Work will be commenced in a few days, and it is expected to complete the road early next fall.

Buffalo, Pittsburgh & Western.—The line through to Salamanca has not yet been opened. This company has, however, opened a new line to Bradford, its Salamanca extension making connection at Kinzua, Pa., with the Bradford & Kinzua Division of the Buffalo, New York & Philadelphia road.

California Southern.—The southern terminus of this road is not at San Diego proper, but on San Diego Bay three miles further south at a place called National City, largely owned by the railroad company. The first cargo of material was landed here last August, and now the rails are laid and trains are running for 108 miles north, to within 22 miles of Colton, where connection will be made with the Southern Pacific. Tracklaying is delayed here, waiting the arrival of an overdue cargo of rails. Stages run between Colton and the end of the road, and the journey from San Francisco to San Diego can be made in about 36 hours.

Central, of New Jersey.—Last Monday morning Chancellor Runyon delivered his opinion on the petition for an election of directors. He ordered the books closed, and twenty-one days of an election to be advertised. The present board of directors may appoint three inspectors, and submit the names to the Court ten days before the election. In accordance with this order an election is announced June 23. The Gowen-Vanderbilt interest claims to have a controlling interest in the stock.

Chicago, Burlington & Quincy.—It is said that this company will build a branch from the Republican Valley Division at Table Rock, Neb., southeast to St. Joseph, Mo., about 80 miles. It will be a cut-off connecting the new Denver Extension with St. Joseph.

Chicago & West Michigan.—The extension from New Buffalo to LaPorte, Ind., was opened for business on May 22.

Chicago & Eastern Illinois.—As to the late decision of the United States Supreme Court, the Chicago *Tribune* says: "In the main case, it appears, a rehearing was refused, and a re-argument was ordered only in case No. 173, which refers to the deeding of the property to the Eastern Illinois." Mr. Walker, attorney for the Chicago, Danville & Vincennes stockholders, said "it should be first understood that there were two cases in the Supreme Court. The first, No. 82, was an appeal from the final decree of foreclosure, decreeing the principal of the bonds then due, the payment thereof with past-due interest within twenty days, and, in default of such payment, a sale of all the property." The record in this case contained, as Mr. Walker claims, all the evidence and proofs submitted. After the reversal, the counsel for the Chicago & Eastern Railroad Company and appellees filed their petition for a reargument, and presented with their petition a supplemental record of several hundred pages of experts' affidavits and certificates of the Circuit Court officers. In this case, the petition was not allowed and the decree stands reversed. No. 173, Mr. Walker said, is an appeal from a subsequent order of the Court, directing the Master to execute a deed to the purchasers and form a deficiency decree against the company in favor of the purchasers. This is a short record, without any evidence or proofs, none being necessary, as the errors claimed appear of record. In this case reargument was ordered. Mr. Walker further stated that the mandate will soon be sent on from the Supreme Court, and that the trustees, Fish and Fosdick, the appellants, will proceed on the foreclosure case as if no decree of foreclosure had been entered."

Chicago, Milwaukee & St. Paul.—It is said that this company intends to build a branch from Elgin, Ill., on the Chicago & Pacific Division, up the east side of Fox River and past Geneva Lake, and thence northwest to Milton, about 75 miles. This would complete a new line from Chicago to Madison.

Chicago & Northwestern.—The Grand Forks (Dak.) *Herald* says that this company has agreed to extend its James River Branch, now in operation from Huron north 90 miles to Ordway, 75 miles further north to a point north of the North Pacific, if the Grand Forks & Missouri Valley Company will build a line of the same length from Grand Forks southwest to meet it, and that the latter has accepted the offer. Nothing is said as to the time when the new road is to be built.

Contracts are reported to have been let for grading on the Caltiope Branch to the Vermilion River, to be finished Aug. 1; on the Algona Branch, to be finished to Swan Lake by Aug. 1; to Spirit Lake, by Oct. 1; Tracy by Nov. 1, and on the Maple River Branch, to be finished to Sioux City by Sept. 1.

Chicago & Western Indiana.—It is reported that this company will consent to make the northern terminus of its road at Harrison street in Chicago instead of Van Buren street, and will build there a great passenger station for the use of the Chicago & Eastern Illinois, the Wabash, the Grand Trunk and the Chicago & Atlantic, whose passenger trains will enter Chicago over this road, which was built for the purpose of affording a city entrance for such roads as might desire to lease one.

Cincinnati, Hamilton & Dayton.—It is reported that the 20,000 shares of stock bought by Mr. Jewett to control the road in the Erie's interest were sent to him last Monday from Cincinnati.

Cincinnati, Indianapolis, St. Louis & Chicago.—At a meeting of the board in Cincinnati last week, it was resolved to issue additional stock to the amount of $1,000,000, for the purpose of buying additional equipment and building new stations and elevators. The resolution will be submitted to the stockholders at a meeting to be held next month.

Cincinnati & Southeastern.—The contractors, P. P. Dickinson and C. Q. Colton, have suspended work, the company having failed to pay them according to agreement. Some 30 miles of the road are graded across Campbell County, Ky., and some work has been done at other points.

Connecticut River.—The new Cheapside bridge, near Greenfield, Mass., has been completed, tested and accepted, and trains are now using it. The bridge is of iron, and replaces a wooden bridge, which was burned down last September.

Elizabeth City & Norfolk.—It is reported that the Clyde syndicate, which controls the Richmond & Danville, has been buying up stock of this company, with a view to securing a controlling interest.

Exchange of Branches.—Last year the Chicago & Northwestern graded and nearly completed a branch in western Iowa from Carroll southwest to Kirkman, which is within seven miles of the Rock Island's branch at Harlan, and also a branch of this line southward to the northern and of another branch of the Rock Island at Audubon. It is now reported that the Rock Island will exchange an extension of its branch from Harlan to Kirkman for seven miles of the Northwestern's branch from Audubon north to Gray. The Omaha line of the Chicago, Milwaukee & St. Paul will cross near the proposed points of junction.

Flint & Pere Marquette.—This company has under construction at Detroit two wooden propellers of about 700 tons each with which to establish a line between Milwaukee and Ludington. They are to be ready Sept. 1.

Florida Tropical.—Contracts are to be let shortly for the grading of this road from Panasofkee, Fla., to Tampa, about 70 miles.

Fort Madison & Northwestern.—The American Securities Company of London advertised May 13 for subscriptions for $500,000 of this company's first-mortgage 7 per cent. sinking-fund gold bonds at £210 (=$1,022) per $1,000 bond. The advertisement says these bonds are issued at the rate of $7,000 per mile, that between 40 and 50 miles of the road are now completed, mainly by share capital and local contributions, and that the portion now operated is producing satisfactory results. The issue is to extend the road to Oskaloosa.

Hot Springs.—This company has begun the construction of shops at Malvern, the junction with the Iron Mountain road. There is talk of extending the road from Malvern eastward about 45 miles, there to meet the Texas & St. Louis road.

Illinois Midland.—The general offices, which have been at Terre Haute, Ind., were removed May 22 to Decatur, Ill.

Indianapolis & Chicago Air-Line.—A telegram from Indianapolis says that work on this road has been considerably impeded between Delphi and this city by difficulties between a number of sub-contractors and their men. The latter having lost money on their contracts refused to pay their men, who thereupon stopped work. The unfinished contracts have been relet to responsible parties, and the work will now go steadily forward. The iron is down to within six miles of Delphi, and the entire line to Westfield is to be completed by June.

Indianapolis & St. Louis.—Judge Gresham, at Indianapolis, has appointed J. H. Devereux Receiver, fixing his bond at $100,000, the same to be filed within ten days. If the second and third mortgages, which were recently foreclosed, are not paid in ten days, the Receiver will, as soon thereafter as possible, file an inventory of all indebtedness, and the road will be sold July 2 without a further extension of time. This will probably result in the union of the road with the Cleveland, Columbus, Cincinnati & Indianapolis, which is the largest creditor, having made large advances to pay coupons and for improvements of the road, by which it is connected with St. Louis.

Manhattan Elevated.—In the suit of this compan against the New York Elevated Railroad Company and others, Judge Donohue last Monday in the Supreme Court gave a decision granting an injunction to restrain certain stockholders of the defendant company from bringing any more suits to test the questions as to the validity of the new agreement whereby the plaintiff pays rent at the rate of but 6 per cent. on its stock of the defendant company, instead of 10 per cent., as was agreed at the time of the original issue of stock. Three suits were already in existence, brought by stockholders of the defendant company to test the question, and more were threatened. The Judge holds that to bring any more suits for the same purpose until those already in existence have been determined, would be simply harrassing and oppressive to the plaintiff.

Marietta & North Georgia.—Work is progressing steadily upon the extension of this road. The grading is

now completed to Jasper, Ga., 17 miles northward from the present terminus at Canton.

Mexican Railroad Concessions.—The Boston *Herald* of May 19 says: "Following is a list of all the railway concessions granted by the President of Mexico since September last, and which will all doubtless be ratified by the federal Congress, having already received the approval of the permanent committee of that body:

"1. To Gen. Pedro A. Gonzalez, for a railroad from Villa de Pichucalco to Paso de Casahuyapa.

"2. To Antonio Couttloeuc, for a railroad and telegraph and telephone lines, from the station of Dolores on the Vera Cruz road to the city of San Andres Chalchicomula.

"3. To Angel Jimenez Arguelles, for a railroad from Orizaba to the town of Ingenio.

"4. To Mr. James Sullivan, for a branch road from Teoloyucan and Huehuetoca to Irolo.

"5. To Ignacio Alas and Thomas Rogers, for a railroad from Tijuana on the northern frontier, passing through Punta Isabel, and to form a junction with the Sonora road at the point most convenient; and a branch road to connect the towns of Magdalena and Altas.

"6. To Sebastian Camacho and David Ferguson, for the continuation of the railroad from the city of Hermosillo, Sonora, to a place called Nogales, on the northern frontier of Sonora, passing through Magdalena and connecting there with the Atchison, Topeka & Santa Fe Railroad.

"7. To Mr. Delphin Sanchez, for a railroad and telegraph line from the city gate of Peralvillo to the baths of El Peñon, connecting at Las Reves with the railroad to Irolo.

"8. To Mr. Hector de Castro, for a railroad and telegraph from San Fernando, state of Tamaulipas, southward, to the port of Tampico.

"9. To Dr. Edward Clay Wise (since deceased), for a railroad from the port of San Benito to the town of Tapachula in the state of Chiapas, which may extend to the line, so as to connect with the Mexican Southern Railroad when built.

"10. To Francisco Arteaga, for a railroad and telegraph from Irolo, passing through Puebla, Chietla and Matamoras, to connect with the Morelos or Acapulco Railroad at the most convenient point.

"11. To Guillermo Andrade, for a railroad to start at Point Isabel toward the frontier and connect with one or more of the railroad lines which run to San Francisco, Cal."

Milwaukee & Northern.—It is reported that this company has determined to establish its new general shops at Fort Howard, instead of Green Bay, as was at first intimated.

Nashville, Chattanooga & St. Louis.—This company makes the following statement for April, and the ten months of its fiscal year, from July 1 to April 30:

	April.	Ten Months.
Earnings	$154,155	$1,628,149
Expenses	79,343	958,502
Net earnings	$74,812	$669,647
Interest and taxes		453,057
Surplus		$216,590

For the ten months there was a decrease of $156,839, or 8.7 per cent., in gross earnings; a decrease of $126,623, or 11.6 per cent., in expenses, and a decrease of $30,216, or 43.2 per cent., in net earnings.

New York & Atlantic.—This company has leased the Sea Beach Railroad and also the Sea Beach Hotel at Coney Island. It has also secured a lease of a part of the Brooklyn, Bath & Coney Island road, which will be used as the connection betweeen its projected line and the Sea Beach road

New York, Chicago & St. Louis.—This road now has 152 miles of track laid from Cleveland east to Irving, N.Y., and 316¾ miles from a point four miles east of Grand Crossing, near Chicago, eastward to Rocky River, O., leaving 45 miles to be laid to complete the road. Nearly 200 miles of track have been laid since Jan. 1, and 72½ since our statement April 14. Nearly all the iron work for the important Cleveland viaduct is now on the ground, and a considerable portion in place.

New York, New Haven & Hartford.—An unsuccessful attempt to wreck the "Owl train," which leaves New Haven for New London at 12:45 a. m., was made on the morning of the 24th, near Madison, Conn. Five unknown men placed two ties projecting between the rails on the East River trestle. They were discovered at their work by Charles I. Wade, station agent at East River. Mr. Wade was shot through the arm, but succeeded in reaching his station and stopping the train.

New York City & Northern.—Mr. Arthur Leary, of New York, was on May 24 appointed by Judge Donohue, of the New York Supreme Court, temporary receiver, with all the powers of permanent receiver. He was ordered to pay arrears of wages and bills for supplies, not to exceed $25,000. This action is based on the judgment rendered a few days since of $92,934.74 in favor of the New York Loan & Improvement Company, being principal, interest and costs of call loans made to the railroad company between Feb. 6 and April 21 of this year.

New York, Pennsylvania & Ohio.—In the case in which James McHenry applied for an injunction to prevent this company from issuing warrants for the interest on its first-mortgage bonds, to be funded into bonds of the same rank, Judge Williamson, of the Court of Common Pleas, has decided that the company has authority to make the issue, and has refused the injunction. Under the reorganization, the company was to pay 7 per cent. on the $35,000,000 of first-mortgage bonds, in cash if *earned*, but if not earned then in bonds of the same rank. The amount of deferred warrants now subject to exchange for first-mortgage bonds is $1,479,565. With this new issue added, the total amount of first-mortgage bonds outstanding will be $37,409,565, which is an increase of $2,909,565 over the first issue of first-mortgage bonds as made by the trustees of reorganization in March, 1880.

New York, West Shore & Buffalo.—The contract for building the Albany Branch has been let to Ward, Mackin & Co., the work to be done in four months. This branch will extend from Coeymans, N. Y., on the old Athens Branch of the New York Central (now owned by this company) to Albany. It is 13 miles long, and some heavy work will be required.

Northern Pacific.—The tracklayers have reached Gray's Bluffs, 158 miles west of Glendive, Montana, and 59 miles beyond the terminus at the end of 1881, and 826 miles west of Duluth. After the completion of some heavy grading at the bluff this week, the tracklayers are expected to advance 1¼ miles per day, and to cross Big Horn, and go through the tunnel at Big Horn Mountain by June 10; Billings, 60 miles west, by Aug. 1, and Benson, 338 miles west of Glendive, by Oct. 1. Benson is at the last crossing of the Yellowstone, where the road enters Yellowstone valley through Bozeman Tunnel, at the east end of the Rocky Mountain Division. This division, from Bozeman to Frenchwoman's Creek, is 150 miles long. On it work is being vigorously pushed, and will be nearly or quite completed this year. Work on the division west of the Rocky Mountains is proceeding well.

On the western end of the road track has been laid to Pack River, 20 miles eastward from the late terminus at Pend d'Oreille, Idaho. At Pack River a trestle 7,100 ft. long has just been finished. At Clark's Forks, Idaho, 20 miles further on, a number of bridges will be required; work on them is progressing well. The Master Bridge-Builder has a large force at work. Grading is finished to the Montana line.

Ontario & Quebec.—A telegram from Toronto says that the capital required to build this road between Toronto and Ottawa has been raised, and that it is now under contract, to be completed by January, 1884. It was intended to connect it through the Credit Valley with the Great Western, and so make a route from Detroit to Montreal and Quebec, which would compete for American traffic with the Grand Trunk. Now that the latter company is likely to control the Great Western, the Canada Southern is substituted for the Great Western.

Oregon Railway & Navigation.—At the annual meeting June 19 the stockholders will be asked to vote upon a proposition to amend the articles of incorporation so as to give authority to construct and equip the following railroad and telegraph lines, namely: First.—A line from the city of Walla Walla in a generally northeasterly direction to Snake River, at or near Texas Ferry, and thence following the valley of the Snake River to Lewiston in Idaho, with a branch from a point three miles south of Grange City easterly to Lewiston. Second.—A line from Walla Walla to Pendleton, in the county of Umatilla, in Oregon. Third.—A line from a junction with the present railroad between the Dalles and Umatilla, near the mouth of John Day's River, up the valley a distance of about 90 miles, to the big bend of the river, with a branch from a point at or near the mouth of Rock Creek, up the valley to a point about 30 miles distant from the mouth. Fourth.—A line from a junction with the road from the Dalles to Umatilla, at or near the mouth of Willow Creek, up the valley of Willow Creek, to the town of Heppner. Fifth.—A line from a point of junction with the present located line from Umatilla to Baker City, at or near the mouth of Butter Creek, up the creek to a point 30 miles from the junction. On the line from Umatilla, Or., to Baker City, track has been laid to the first crossing of the Umatilla River, 23 miles, where a bridge is being built. The grading is done for about 40 miles.

Oriental Construction Company.—General G. M. Dodge, President of the Oriental Construction Company, has issued the following circular: "The Oriental Construction Company has been organized for the purpose of building an extension of the Southwest system of railroads from Laredo to the city of Mexico (about 600 miles), and has a capital of $10,000,000, $7,000,000 of which has been taken by parties interested in the Southwest system. Three million dollars of this stock has been reserved for the purpose of allowing further subscriptions in the same interest.

"The Oriental Construction Company has a contract with the Mexican, Oriental, Interoceanic & International Railroad Company for the construction of their line from New Laredo to the city of Mexico, for which it receives $20,000 per mile in first-mortgage bonds of the company, $20,000 in stock and $9,000 in subsidies from the Mexican government. The interest upon the bonds is secured by a traffic arrangement on the roads of the entire Southwest system, by which 25 per cent. of the proceeds of all traffic to or from the said road is paid into the Mercantile Trust Company to meet the interest upon them, provided the road itself should not earn sufficient during its construction to meet this interest. Said traffic agreement is to continue until the road earns interest upon its bonds and 2 per cent. upon its capital stock for five consecutive years. The company has spent more than a year in close examination of the line of the road, and it now has its surveys practically completed from New Laredo to the city of Mexico. Five hundred miles of the line are over a comparatively level country, in which the grades do not exceed 1 per cent. and the character of the work is about the same as that of the roads which have been lately constructed in the state of Texas. A very feasible line has been found rising to the table lands of the city of Mexico, the rise being made in sixty miles of distance, and whatever this sixty miles costs in excess of the cost of the work upon the plain is to be repaid to the Construction Company. All iron, steel and other material, including equipment of all kinds for the construction and maintaining of the road used by the company, is admitted into the republic of Mexico free of duty, thus materially reducing the cost of the road below the cost of similar roads in the United States.

"A thorough examination of the line for its commercial advantages and the revenue it will receive demonstrates the fact that it runs through a portion of Mexico that locally must give it a large business. It skirts the Sierra Madre range at an elevation of 1,500 ft. above the level of the sea, taking in a country that abounds in valuable woods and all tropical products, and passes through the centre of the best producing mineral state of the Republic, and being from 100 to 400 miles shorter in distance from the city of Mexico to all points in the United States east of Colorado, gives it a great advantage for through business over all other roads, and under its contract it has the active and interested support of the entire Southwest system of roads, covering over 9,000 miles of productive railroad lines, reaching all the commercial centres west of Lake Erie."

Philadelphia & Atlantic City.—Mr. William Massey, the President, and Mr. Ellis Clark, the Superintendent of this road, deny that it has been sold to the Canada & Atlantic, as was reported lately

Pittsburgh Junction.—In the United States Circuit Court in Pittsburgh a suit has been begun on behalf of the Attorney General of the United States to enjoin this company from building its road as located along the banks of the Allegheny River. The grounds of the complaint are that the filling needed will interfere with and obstruct the channel of the Allegheny, and also that the road will shut off and prevent free access to the navigable waters of the river.

Provincial & New England All Rail Line.—A meeting was held in St. John, N. B., May 17, of representatives of the roads composing this line—the Eastern, the Maine Central, the European & North American, and the St. John & Maine. Representatives were also present from the Inter-Colonial and the Prince Edward Island roads. A new division of freight traffic was discussed and agreed on. It was decided to shorten up the time of the through express trains between St. John and Boston. The question of putting on a special fast express was discussed, but no conclusion was reached.

St. John & Boston Shore Line.—This line is projected to run from St. John, N. B., to Bangor, Maine, and to be composed of the Grand Southern Railway, now being completed from St. John to the St. Croix River, at St. Stephen, 82 miles, and the Maine Shore Line Railway from Calais to Bangor, Maine. The whole distance is about 210 miles, of which 40 per cent., in round numbers, is reported to be now about finished, well built, laid with steel rails and equipped with rolling stock, shops, turn-tables, station houses, etc.

Power is given in the charters of both roads to consolidate into one line. The line runs through the coal and red granite regions of St. John and Charlotte counties, in New Brunswick, and the counties of Washington and Hancock, in Maine, with a population of 83,000 people, now without railway facilities. The five counties, including the terminal counties through which the road runs, have a population, in round numbers, of 237,000. The road is intended to make close connections with the Maine Central at Bangor, and to run through cars without change from St. John to Boston, touching and connecting with Mt. Deser., Campobello and other summer resorts in Maine. The intention is to lay the whole line with steel rails, and have it thoroughly constructed throughout, and to limit its bonded debt to $15,000 per mile, including all equipment.

St. Paul, Kasson & Iowa.—This company has filed articles of incorporation in Iowa setting forth its purpose to construct a railroad from St. Paul southward through Kasson, Dodge County, to the Iowa line.

St. Paul, Minneapolis & Manitoba.—A Dakota paper attributes to this company the intention of extending its Grand Forks Branch till it reaches the Pacific, but no authority but the imagination of the writer is given for the statement.

Saratoga, McGregor & Lake George.—This is to be a branch of the Adirondacks Railroad from Saratoga Springs to Mount McGregor, 10½ miles. Grading was begun March 17, and now tracklaying is under way and will be completed as fast as the trestling (of which there is considerable) will permit. It is expected to finish tracklaying by the middle of June and open the road for traffic the first of July. From the foot of the mountain to the top there is a sustained grade (compensated for curvature) of 4 per cent., or 211 ft. per mile. The sharpest curve is 24 degrees. The company has received 1,000 acres of land, including two fine lakes, on the mountain at an average height of 800 ft. above the Springs and the country around, and it is intended to make a park of it and a summer resort attractive to the great throng of residents at Saratoga for its mountain air and fine views. H. K. Porter & Co., of Pittsburgh, supply the locomotives for this road, and J. M. Jones & Co., of Schenectady, the cars.

Savannah Valley.—Work is to be begun immediately on this road, which will extend from Dorris Mine, S. C., the present terminus of the Augusta & Knoxville, northwestward to Anderson Court House.

Seneca, Ottawa & Mendota.—Articles of incorporation of this company were filed with the Secretary of State of Illinois May 19. It purposes to build a railroad from the Rock Island road at Seneca northwest to the Burlington & Illinois Central road at Mendota, about 30 miles. The object is to form an extension of the Kankakee & Seneca Railroad. Its capital stock is to be $100,000, and the incorporators are Francis L. Fiske, Thomas D. Catlin, William H. Hull and Marshall H. Armstrong, all of Ottawa, Ill.; Alexander Bruce, Marseilles, Ill.; Dwight Lawrence, Prairie Centre, Ill.; and Arthur C. McIntyre, Mendota, Ill.

Shamokin, Sunbury & Lewisburg.—Ground has been broken for this road at Shamokin, Pa., and also at Sunbury.

South Florida.—Trains are now running between Sanford and Kissimmee.

Stony Clove & Catskill Mountain.—Trains on this road now run to Tannersville Junction, N. Y., two miles beyond the late terminus at Stony Clove, and 12 miles from the junction with the Ulster & Delaware at Phœnicia. The latest time table shows two trains a day each way over the road; this number will be increased when the summer travel begins.

United States Rolling Stock Company.—London papers of May 13 have the advertisement of this company, inviting applications for an issue of £200,000 of 6 per cent. debentures offered at 103, of which 5 is payable on application, 18 on allotment, and 20 each on the last day of June, August, October and December. The capital thus raised is "to take advantage of the facilities possessed by the company for entering into profitable building contracts offered by railroad companies desirous of acquiring additional rolling stock under the 'car trust' system." The company proposes to construct the cars thus disposed of at its own works, and its experience gives it an advantage in the business both of construction and of "car trust" sales.

Valley, of Ohio.—On the extension of this road from Canton, O., southward, track is now laid to Sparta, 12 miles. But three miles remain to reach Mineral Point, where a junction with the Wheeling & Lake Erie road will be made.

Venice & Carondelet.—The stockholders of this company have authorized an issue of $550,000 new bonds for the purpose of completing the road. The bonds will be guaranteed by the Illinois & St. Louis Company.

Washington & Ohio.—It is reported that a contract has been practically concluded for the sale of this road to the Baltimore, Cincinnati & Western Company, which will make it part of its line from Baltimore to Cincinnati.

Western Maryland.—The Baltimore City Council has passed and the Mayor has signed the ordinance granting additional city aid to this company, for the purpose of making improvements of the road and buying additional equipment for through traffic.

Western North Carolina.—Arrangements have been completed for running through trains in connection with the East Tennessee, Virginia & Georgia road. The dividing point will not be at Paint Rock on the state line, where the tracks met, but seven miles east of that point, at Warm Springs, the East Tennessee trains using the Western track to that point. This arrangement is made because Warm Springs is a mere convenient point for a division station than Paint Rock.

Warm Springs is 181 miles from Salisbury, 311 miles from Raleigh and 419 miles from Richmond. From Warm Springs to Knoxville over the East Tennesse road the distance is 92 miles, making the distance from Richmond to Knoxville 511 miles and from Raleigh to Knoxville 403 miles. The distance from the sea at Morehead City to Knoxville by this North Carolina line, originally projected many years ago and now just completed, is 547 miles. It is not likely, however, that much East Tennessee freight will find its way to Morehead City.

Wheeling & Lake Erie.—At the meeting held in Norwalk, O., May 16, the stockholders voted to ratify the agreement of consolidation with the Cleveland & Marietta Company. No action was taken on the question of building a bridge over the Ohio at Wheeling, that matter being postponed to a future meeting.

ANNUAL REPORTS.

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Cheshire.

This company owns a line from South Asbburnham, Mass., across New Hampshire to Bellows Falls, Vt., 53½ miles. It leases from the Fitchburg Company the use of the Vermont & Massachusetts tracks from South Ashburnham to Fitchburg, 10¼ miles, making 64 miles in all. The road is one of the links which connect the Central Vermont system with the Boston roads. Its report is for the year ending Sept. 30.

The company operates the Monadnock road, from Peterboro, N. H, to Winchendon, Mass., 16 miles, but the report makes no mention of its operations.

The equipment consists of 30 engines; 23 passenger, 2 postal and 8 baggage cars; 221 box, 4 charcoal, 37 hay, 25 stock, 165 flat and 10 freight saloon cars; 9 wood, 10 gravel, 4 service cars and 2 snow-plows.

The general account, condensed, is as follows:

Stock, old		$53,300.00
" preferred		2,100,000.00
Total stock		$2,153,300.00
Bonds		804,100.00
Interest warrants, etc		25,771.00
Profit and loss		8,890.37
Total		$2,992,061.37
Construction	$2,717,535.26	
Materials	141,023.30	
Bills and accounts receivable	46,801.28	
Cash and cash assets	86,701.53	
		2,992,061.37

The bonded debt consisted of $250,000 bonds due July 1, 1896, $550,000 due July 1, 1898, and $4,100 old bonds overdue. Of the last-named, $4,000 have since been presented and paid, leaving $100 still out. The bonds all bear 6 per cent. interest.

The earnings for the year were as follows:

	1880-81.	1879-80.	Inc. or Dec.	P.c.
Freight	$445,161	$432,825	I. $12,336	2.8
Passengers	150,732	136,342	I. 14,390	10.6
Mail, etc	26,702	20,704	I. 5,998	29.0
Total	$622,595	$589,871	I. $32 724	5.5
Expenses	487,184	438,152	I. 49,032	11.2
Net earnings	$135,411	$151.719	D. $16,308	10.7
Gross earn. per mile	9,728	9,217	I. 511	5.5
Net " "	2,116	2,371	D. 255	10.6
Per cent. of exps	78.25	74.27	I. 3.98	.....

No less than 73.6 per cent. of the passenger earnings and 93.8 of the freight earnings were delivered from through business. This explains the large proportion of expenses to earnings, the through business being carried generally for extremely low rates.

The result of the year was as follows:

Net earnings, as above		$135,410.67
Interest on bonds	$48,000	
Rental Vt. & Mass. tracks	51,000	
		99,000.00
Surplus for the year		$36,410.67

From this surplus a dividend of 1½ per cent. on preferred stock was paid after the close of the year (Jan. 10, 1882), which required $31,500, leaving a balance of $4,910.67 to surplus account.

The traffic for the year was as follows:

Train miles:	1880-81.	1879-80.	Inc. or Dec.	P. c.
Passenger	122,070	122,460	D. 390	0.3
Freight	349,991	419,258	D. 69,267	16.5
Switching and service	44,087	32,549	I. 11,538	35.5
Total	516,148	574,267	D. 58,119	10.1
Passengers carried	146,265	134,282	I. 11,983	8.9
Passenger miles	4,599,348	4,346,885	I. 252,463	5.8
Tons freight carried	546,631	501,487	I. 45,144	9.0
Ton miles	30,007,962	28,440,579	I. 1,567,383	5.5
Av. train load:				
Passengers, No	37.67	35.48	I. 4.19	11.5
Freight, tons	85.43	67.83	I. 17.60	25.9

The increased traffic was carried with a very considerable reduction in train service.

The directors' report says: "Your directors found it necessary, in order to meet the demand for a heavy freight traffic at cheap rates, to substitute heavy freight engines for old light ones, and have purchased two for that purpose in the last year. It will be necessary to make further changes to do the entire freight business with improved motive power.

"The usual amount of steel rails was laid, and several new freight cars added to the rolling stock. The main track is now nearly laid with steel rails, and the road is better equipped for a large business than a year ago.

"The through freight business, which constitutes so large a percentage of our gross earnings, is still at too low a rate to afford a fair profit. Every facility will be given to encourage local business on the road."

Cape Fear & Yadkin Valley.

This company owns a line from Fayetteville, N. C., northwest to Gulf, 47 miles. The following statements for the year ending Feb. 28 were submitted at the recent annual meeting.

The debt of the company is as follows:

Mortgage bonds	$52,550
Due the state for convict labor	93,895
Floating debt	115,398
Total debt	$261,843

The assets of the company are as follows: 47 miles of road, with appurtenances, in operation, 78 miles more graded westward, and the Shoe Heel Extension with 40 miles graded, altogether representing more than $1,000,000 of value.

The earnings for the year were as follows:

	1881-1882.	1880-1881.	Increase	Per cent.
Earnings	$42,717	$32,550	$10,167	31.2
Expenses	32,147	29,115	3,032	10.4
Net earnings	$10,570	$3,435	$7,135	207.7
Gr's e'n'gs per mile	909	693	216	31.2
Net " " "	225	73	152	207.7
Per c't. of expenses	75.29	89.45	...	.....

Of the increase in earnings, the sum of $7,969 was from through business, and $2,197 from local business.

Work has been progressing steadily on the grading of the extension to Greensboro and Mt. Airy, but no rails have been laid. Work has also been done on the extension from Fayetteville southwest to the Carolina Central at Shoe Heel, about 40 miles, and the grading is nearly finished.

Ruby Hill.

This company owns a line of 3 ft. gauge from Eureka, Nev., to Ruby Hill, 7 miles. The following statements are for the year 1881.

The stock issued is $150,000; the company has no debt. The cost of the property is reported at $150,000 also; debts due to the company, $6,128.

The earnings for the year, entirely from freight, were as follows:

Earnings ($13,351.97 per mile)	$93,463.78
Expenses (29.51 per cent.)	27,594.18
Net earnings ($9,409.94 per mile.)	$65,869 60

The tonnage is not reported; the road is used chiefly for carrying ore from the mines at Ruby Hill.

There were 11 monthly dividends paid, amounting in all to $70,000, or 46⅔ per cent., showing the little road to have been an extremely profitable property to its owners.

Eureka & Palisade.

This company owns a line of 3 ft. gauge from the Central Pacific at Palisade, Nev., to Eureka, 90 miles. The following statements are from the report made to the State Treasurer for 1881.

The stock and debt were as follows:

Stock paid in	$1,100,000
Bonds	900,000
Other debt	18,353
Total	$2,018,353

The cost of the road and appurtenances is reported at $1,552,117, or $17,246 per mile. The debts due the company were $161,017; total assets, $1,713,134.

The earnings for the year were as follows:

Gross earnings ($4,279.21 per mile)	$385,128.67
Expenses (50.88 per cent.)	195,912.22
Net earnings ($2,102.40 per mile)	$189,216.45

The road carried 33,652 tons of freight during the year.

There were 12 monthly dividends paid, the total amount paid for interest and dividends being $195,000, being 7 per cent. on the bonds and 12 per cent. on the stock.

Pensacola & Perdido.

This company owns a line from Pensacola, Fla., to Millview, 9 miles, which is chiefly employed in carrying lumber from the mills on the Perdido River to the wharves at Pensacola. The report is for the year ending March 31:

The earnings and expenses were as follows:

	1881-82.	1880-81.	Increase.	P. c.
Earnings	$50,421.77	$44,911.91	$5,509.86	12.2
Expenses	27,143.90	26,509.04	634.86	2.4
Net earnings	$23,277.87	$18,402.87	$4,875.00	26.5
Gross earn. per mile	5,602.42	4,990 21	612.21	12.2
Net " "	2,586.43	2,044.76	541.67	26.5
Per cent. of exps	53.83	59.04	.....	.....

The increase in earnings was considerable, and that in expenses small, especially for an increased business.

The income account was as follows:

Passage		$2,744.58
Freight		45,300.86
Dock dues, etc		2,376.33
Total receipts		$50,421.77
Reduction in bills and accounts payable	$3,345.11	
Increase in collectable accounts	1,414.38	
New construction and equipment	3,766.87	
Working and general expenses	27,143.90	
Interest and sinking fund	14,751.51	
		50,421.77

The earnings for the year were sufficient to meet all demands, to make some additions to the property, and to reduce the current liabilities.

Hanover Junction, Hanover & Gettysburg.

This company owns a line from Hanover Junction, Pa., to Gettysburg, 30 miles, and it works the Berlin Branch to East Berlin, 7 miles; the Bachman Valley road, from Valley Junction, Pa., to Ebb Vale, Ind., 13 miles, and the Baltimore & Hanover, from Black Rock, Md., to Emory Grove, on the Western Maryland road, 21 miles, making 71 miles in all. The report is for the year ending March 31.

The equipment consists of 9 locomotives; 12 passenger and 2 baggage, mail and express cars; 42 box, 13 stock, 18 gondola and 36 lime and stone cars; 1 derrick car.

The general account is as follows:

Stock		$116,850.00
Bonds		208,000.00
Floating debt		10,000.00
Dividends unpaid		1,018.28
Profit and loss		316,690.09
Total		$652,558.37
Road and equipment	$501,664.33	
Stocks of leased lines	99,900.00	
Other stocks	16,850.00	
Materials	7,626.75	
Cash and bills receivable	26,517.29	
		652,558.37

The stock is only $3,895 and the bonds $6,933 per mile owned; cost of road, $16,722 per mile. The property and investments have been largely paid for out of earnings.

The traffic for the year was as follows:

Locomotive mileage	162,421
Average per engine	18,047
Mileage of passenger-train cars	215,955
" freight cars	248,780
Passengers carried	51,162
Passenger miles	807,029
Tons freight carried	94,488
Ton miles	812,798
Av. rate per passenger per mile	2.63 cts.
" ton per mile	3.94 "

The increase in passenger miles was 1.1 per cent.; in ton miles, 5.0 per cent. Of the freight-car mileage 85,901 miles were run by foreign cars. The cost of car repairs was 1.65 cents per mile run.

The chief items of tonnage were 31,654 tons iron ore, 16,677 tons lime and limestone, 11,581 tons coal, and 9,154 tons lumber, cord-wood and bark.

The earnings of the year were as follows:

	1881-82.	1880-81.	Increase.	P.c
Freight	$33,906	.....	.....	..
Passengers	21,280	.....	.....	.
Mails, etc	9,928	.....	.....	.
Working leased lines	24,973	.....	.....	.....
Total	$90,087	$79,613	$11,074	14.0
Expenses	58,228	50,222	8,006	15.8
Net earnings	$31,859	$29,791	$2,068	6.9
Gross earn per mile	1,269	1 113	166	14.0
Net " "	449	419	30	6.9
Per cent. of expenses	64.7	63.6	0.1	....

The earnings of the Hanover Junction, Hanover & Gettysburg road proper, excluding the leased lines, were $2,812 gross and $1,076 net per mile. Expenses were increased by the rebuilding of Rock Creek bridge and the Gettysburg engine-house.

The disposition of net earnings was as follows:

Cash and bills receivable, April 1, 1880		$30,714.11
Net earnings for the year		31,858.90
Total		$62,573.01
Construction and equipment	$14,450.00	
Payment of floating debt	5,000.00	
Interest	12,373.85	
Dividends	4,231.87	
		36,055.72
Cash and bills receivable, April 1, 1882		$26,517.29

The report of the President, Capt. A. W. Eichelberger, says: "From the commencement of operations of the Hanover Branch road, Aug. 22, 1852, to the end of the past fiscal year of the consolidated roads, there were carried 943,452 passengers. It is gratifying to your managers to be able to state that of this large number no passenger while traveling in the cars received personal injury.

"The effective and safe condition of the road has been maintained. There was put down during the year 101 tons steel and 56 tons iron rails, 5,821 cross ties were laid.

"The motive power has been maintained in good order. To the equipment was added 19 new box, 3 new stock cars and 2 gondolas and 3 lime and stone cars have been rebuilt. Two first-class Eastlake passenger coaches have been contracted for at the Jackson & Sharp works, Wilmington, Del., to be delivered during the present month. With the addition of these cars it is expected that no further acquisition to the rolling stock will be required for the year.

"The contracts for the operating of the connecting roads have been renewed for the year, the mileage of which including yours, make a total of 71 miles. The relations with these roads and the Western Maryland Railroad continue friendly. The joint business transactions have been conducted satisfactorily."

Grand Rapids & Indiana.

This company owns a line from Fort Wayne, Ind., to Petoskey, Mich., 332.5 miles. An extension from Petoskey to the Straits of Mackinaw is in progress. The company leases the Cincinnati, Richmond & Fort Wayne road from Fort Wayne to Richmond, 86 miles, but its accounts are stated separately. The following report is for the year 1881:

The general account, condensed, is as follows:

Stock		$4,985,081.22
Funded debt		8,000,000.00
Accounts and balances		194,295.96
Bills payable held by Pennsylvania Company		336,839.32
Coupon accounts		2,004,166.38
Total		$15,520,383.48
Road and equipment	$13,267,016.68	
Supplies	91,786.78	
Stocks owned	770.00	
Accounts and balances	248,661.76	
Cash	295,630.81	
Income account, balance	1,616,517.45	
		15,520,383.48

The funded debt consists of $1,010,000 first-mortgage bonds; $1,895,000 first-mortgage land-grant bonds; $4,000,000 first-mortgage land-grant bonds guaranteed by the Pennsylvania Railroad Company, and $1,095,000 income bonds. Coupon accounts include $141,995.61 coupons matured but not presented; $137,502 02 coupons paid and held by the Pennsylvania Company, and $1,724,668.75 coupons paid and held by the Pennsylvania Railroad Company.

The earnings for the year were as follows:

	1881.	1880.	Increase.	P.c.
Freight	$1,206,819	$1,028,882	$177,937	17.3
Passengers	637,693	564,076	73,617	13 1
Mail, etc	96,058	81,008	15,050	18.6
Total	$1,940,570	$1,673,966	$266,604	15.9
Expenses	1,377,680	1,216,010	161,670	13.3
Net earnings	$562,890	$457,956	$104,934	22.9
Gross earn. per mile	5,836	5,034	802	15.9
Net earn. per mile	1,693	1.377	316	22.9
Per cent. of expenses	70.99	72.64	.....	...

The earnings show a very considerable increase in all departments. The expenses also show a considerable increase.

The income account was as follows, somewhat condensed:

Net earnings		$562,890.38
Interest on bonds	$479,925.68	
Advanced for Cin., Rich. & Ft. Wayne road	19,850.72	
		499,785.40
Profit for the year		$63,104.98
Debit balance, Dec. 31, 1880		1,679,622.43
Debit balance, Dec. 31, 1881		$1,616,517.45

This debit balance represents the loss incurred by the company from its operations up to that date. Interest on bonds does not include anything for the income bonds.

Some additional business is expected this year from the extension to the Straits of Mackinaw, and the connection with the new Detroit, Mackinac & Marquette road.

The company has a considerable land grant, including some valuable timber lands.